



# **Integration Objects'** **Bridging OPC HDA and G2**

**G2 OPC HDA Link**  
Version 1.2 Rev.0

**User's Guide**



G2 OPC HDA Link User's Guide Version 1.2 Rev .0  
December 2007

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# Preface

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*Describes this document and the conventions that it uses.*

## About this Guide

This guide:

- Explains how to install G2 OPC HDA Link and how to establish connections with multiple OPC HDA Servers simultaneously and communicate with them through the G2 OPC HDA Link bridge process.
- Describes the system requirements for this release.
- Describes bridge features.

## Audience

To use G2 OPC HDA Link, you must have knowledge of G2 and OPC HDA (Historical Data Access) specification.

# Conventions

## Typographic

Convention Examples	Description
g2-window, g2-window-1, gfr-top-level, sys-mod	G2 class names, instance names, workspace names, and module names
history-keeping-spec, temperature	G2 attribute names
true, 1.234, ok, "Burlington, MA"	Attribute values and values specified or viewed through dialogs
Main Menu > Start KB Workspace > New Object create subworkspace Start Procedure	G2 menu choices and button labels
conclude that the x of y ...	Text of G2 procedures, methods, functions, formulas, and expressions
<i>new-argument</i>	User-specified values in syntax descriptions
<u><i>text-string</i></u>	Return values of G2 procedures and methods in syntax descriptions
File Name, OK, Apply, Cancel, General, Edit Scroll Area	GUIDE and native dialog fields, button labels, tabs, and titles
File > Save Properties	GMS and native top-level menu choices and native popup menu choices
<b>workspace</b>	Glossary terms
c:\Program Files\Gensym\g2	Windows pathnames
spreadsh.kb	File names

Convention Examples	Description
<code>g2 -kb top.kb</code>	Operating system commands
<code>public void main() gsi_start</code>	Java, C and all other external code

## Procedure Signatures

A procedure signature is a complete syntactic summary of a procedure or method. A procedure signature shows values supplied by the user in *italics*, and the value (if any) returned by the procedure *underlined*. Each value is followed by its type:

```
g2-clone-and-transfer-objects  
(list: class item-list, to-workspace: class kb-workspace,  
delta-x: integer, delta-y: integer)  
-> transferred-items: g2-list
```

## Related Documentation

### Integration Objects

- *OPC development toolkits*  
<http://www.integ-objects.com>

### G2 Core Technology

- *G2 Bundle Release Notes*
- *Getting Started with G2 Tutorials*
- *G2 Reference Manual, Volumes I and II*
- *G2 Developer's Guide*
- *G2 System Procedures Reference Manual*
- *G2 Class Reference Manual*
- *Telewindows User's Guide*
- *G2 Gateway Bridge Developer's Guide*

### OPC Foundation

- *OPC Historical Data Access*  
<http://www.opcfoundation.org/Downloads/Default.asp#Historical%20Data%20Access>



## **G2 Utilities**

- *G2 ProTools User's Guide*
- *G2 Foundation Resources User's Guide*
- *G2 Developer's Interface User's Guide*
- *G2 Menu System User's Guide*
- *G2 XL Spreadsheet User's Guide*
- *G2 Dynamic Displays User's Guide*
- *G2 GUIDE User's Guide*
- *G2 GUIDE/UIL Procedures Reference Manual*
- *G2 OnLine Documentation Developer's Guide*
- *G2 OnLine Documentation User's Guide*

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# Introduction

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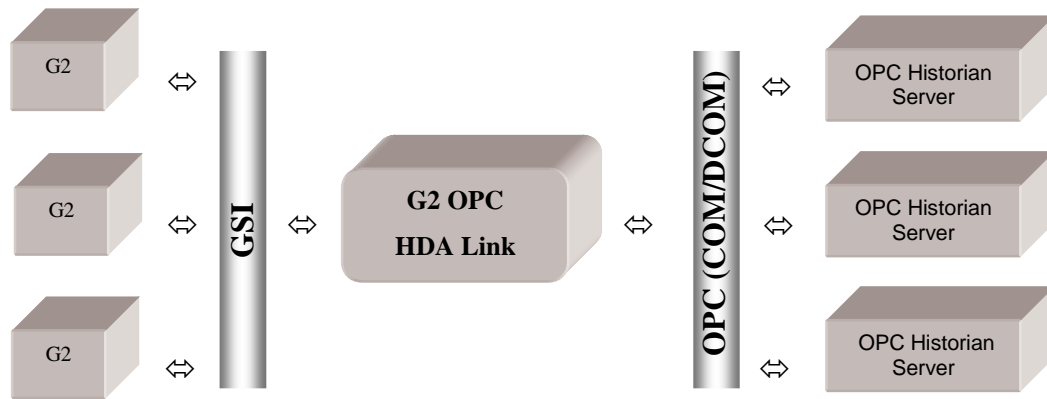
*Describes the G2 OPC HDA Link*

## Introduction

G2 OPC HDA Link allows G2 applications to access the data points stored in any OPC Historian Server (Historical Data Access Server).

G2 OPC HDA Link presents OPC items as native G2 objects. Each OPC item is represented by a `gsi-opchda-item` object, which allows G2 to access and reference the data in the same way as other G2 variables. In addition, G2 OPC HDA Link provides remote procedure calls (RPCs) for managing and browsing an OPC Historian Server. This data can be used for trend analysis and sophisticated inferencing by the G2 inference engine.

## System Architecture



## Release Compatibility

G2 OPC HDA Link has specific compatibility requirements with G2 and G2 Gateway.

### G2

The G2 OPC HDA Link knowledge base supplied with the bridge, G2-HDA.kb, is compatible with G2 Version 6.1 Rev. 0 or later on any platform where G2 is supported.

### G2 Gateway

It is not necessary to have a separately installed G2 Gateway to run this version of the bridge.

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#### Note

To achieve a successful installation, you must use only software components provided with this release.

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# Installing and Running

## G2 OPC HDA Link

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*Describes how to install the G2 OPC HDA Link.*

### Introduction

To retrieve historical data from OPC HDA Server(s), you can use G2 OPC HDA Link in local and distributed configurations:

- In local configurations, G2 OPC HDA Link and OPC Server(s) all run on a single machine. In this case, the installation process does not need any specific settings.
- In distributed configurations, G2 OPC HDA Link and OPC Server(s) run on two or more machines cooperatively, where the bridge initially resides on a remote machine (the client computer) on the network and uses the DCOM mechanism to access server(s) directly. To enable distributed configurations, you must configure various settings on both remote server and local client computer.

This chapter describes how to configure DCOM Config Utility settings for computers on which G2 OPC HDA Link and OPC server(s) are running.

### System Requirements

- G2 Version 6.1 Rev. 0 (or later).
- OPC Servers compliant with OPC Historical Data Access Specification Version 1.2.
- Windows NT 4.0 (Service Pack 6a), Windows 2000 (Service Pack 3) and Windows XP.
- A minimum of 128 MB free disk space.



# Installing the G2 OPC HDA Link

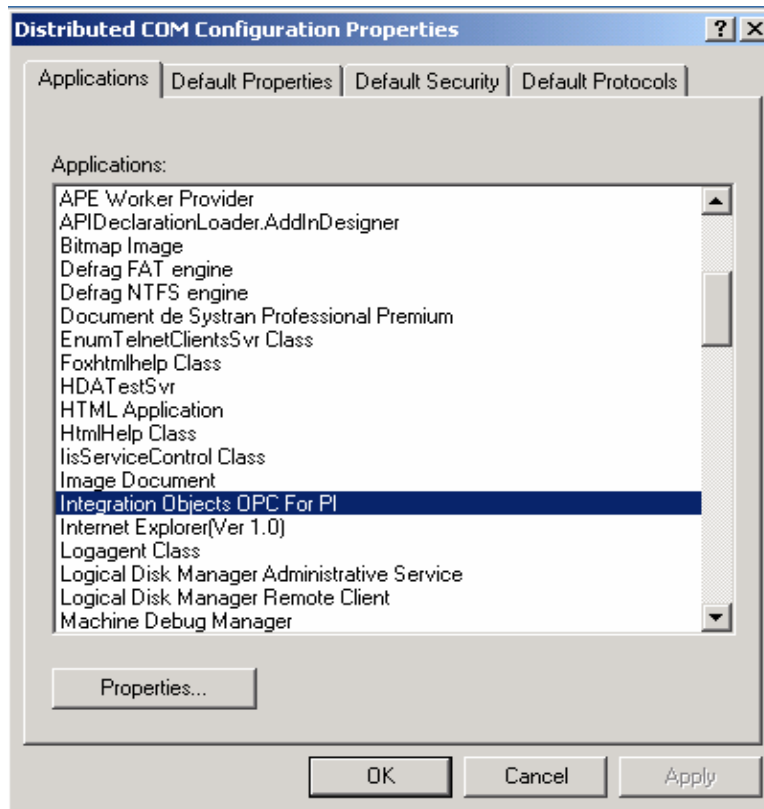
## Configuring the Client for DCOM

### Setting up the Client

To set up the client:

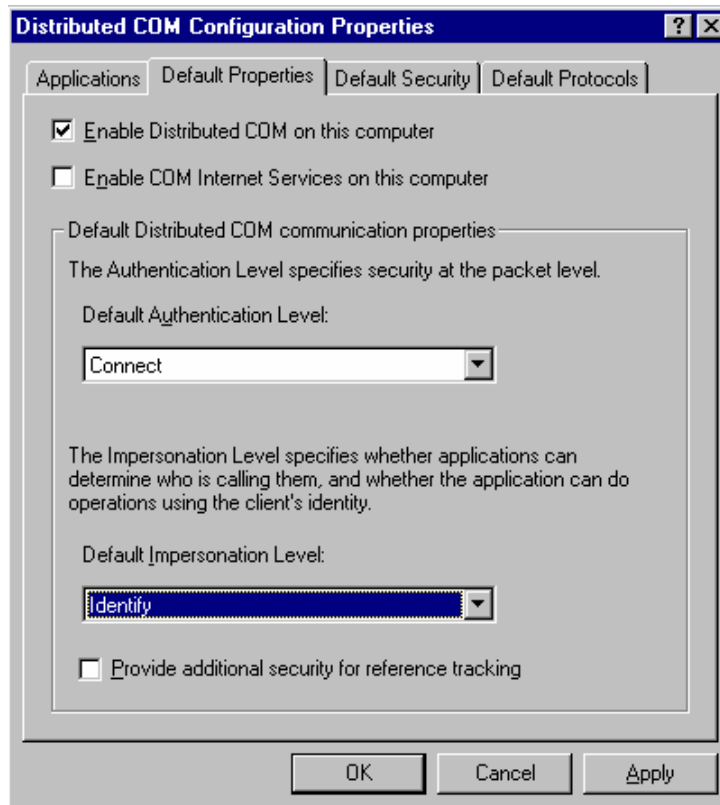
- 1 Log as Administrator.
- 2 Choose Run from the Windows Start menu and type dcomcnfg, then click OK to run the program for configuring DCOM.

The DCOM configuration utility looks like this:



- 3 Click the Default Properties tab and configure the dialog, as follows:
  - a Ensure that the Enable Distributed COM on this computer is enabled.
  - b Configure the Default Authentication Level to be Connect.
  - c Configure the Default Impersonation Level to be Identity.

The Default Properties tab should look like this:



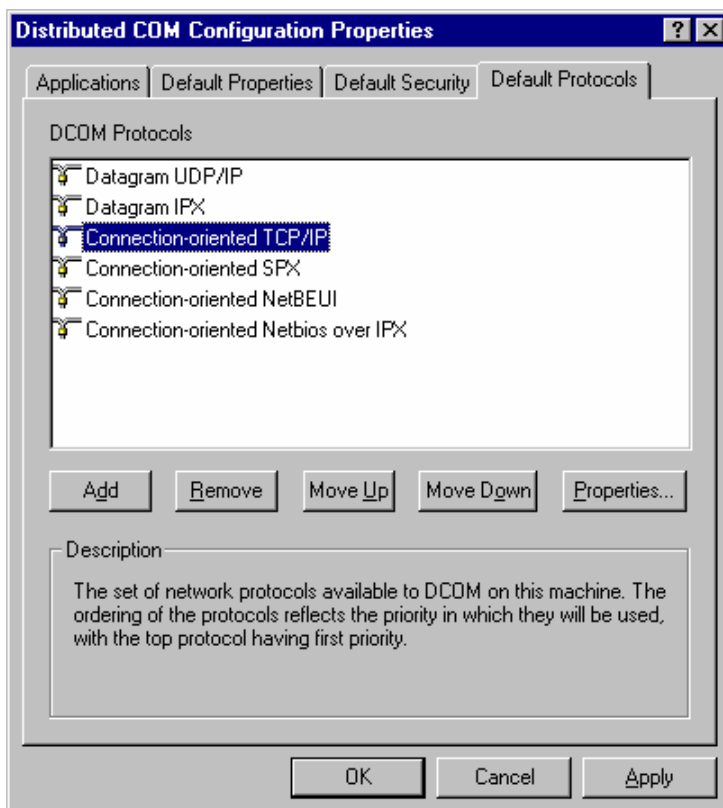
- 4 Click the Default Security tab:



This is where you configure who has access to G2 OPC HDA Link from remote OPC servers. You only need to be concerned with the Default Access Permissions button on this tab.

- 5 Under Default Access Permissions, click the Edit Default button and configure the users of remote OPC Servers whom you want to be able to make callbacks to this machine when G2 OPC HDA Link performs subscription-based read operations.

- 6 Click the Default Protocols tab:



This is where you set which installed network protocols on the client computer to be used for DCOM.

- 7 Configure the DCOM Protocol to use Connection-oriented TCP/IP.

### Registering OPC Server(s)

You must now register the OPC Server(s) that G2 OPC HDA Link will connect to and specify their locations on the named remote servers. You can use one of two techniques, depending on the client environment.

#### To register the OPC Server(s), using a customized registry file:

- ➔ Prepare and apply a customized `.reg` file on the client computer, as described in the Microsoft registry documentation.

#### To register the OPC Server(s) automatically:

- 1 Install the OPC Server on the client computer, to automatically register the server in the registry.
- 2 Remove the entries for `InProc` and `OutOfProc` servers, then add an entry for `RemoteServerName`



The DCOM configuration utility uses this technique, but you must still configure the client computer manually.

**Note**

In either case, the desired registry information for the OPC Server must not include the LocalServer32 or InProcServer32 keys, and must include the AppID key and the associated RemoteServerName.

If the server application name does not show up in the DCOM configuration control panel, make sure that there is an AppID key associated with the object server's CLSID in the Registry, as follows:

```
[HKEY_ROOT_CLASSES\CLSID\{clsid}]  
"AppID"="{clsid}"
```

For example, when installing the OPC Server on the client computer, to access remotely "Integration Objects OPC for PI," which is an OPC server for PI, enable the Run application on the following computer option and enter the NetBIOS name of the computer on which to run the application, as shown below:



## Configuring the Server for DCOM

### Setting up the Server

#### To set up the server:

- 1 Launch the **DCOM Config** Utility on the computer your target OPC HDA Server is running.
- 2 Configure the **Default Properties** tab as you did on client side.
- 3 Click the **Default Security** tab.

This is where you tell the operating system who you will allow to access OPC Servers on this machine (Default Access Permissions), who you will allow to launch OPC Servers on this machine (Default Launch Permissions), and who will allow you to configure OPC Servers on this machine (Default Configuration Permissions).

- 4 Click the **Default Access Permissions** tab.

On this tab, when you click **Add**, you will be presented with a dialog that lets you browse the local machine and domain (if applicable and logged into a domain) for users and groups to which to grant permissions.

- 5 Click the **Default Security** tab and click Edit **Defaults under Default Launch Permissions**.

On this tab, you define who can actually start your OPC HDA Server on this computer. You add users/groups the same way you did when configuring **Access Permissions**.

- 6 On the **Default Security** tab, click Edit Defaults under **Default Configuration Permissions**.

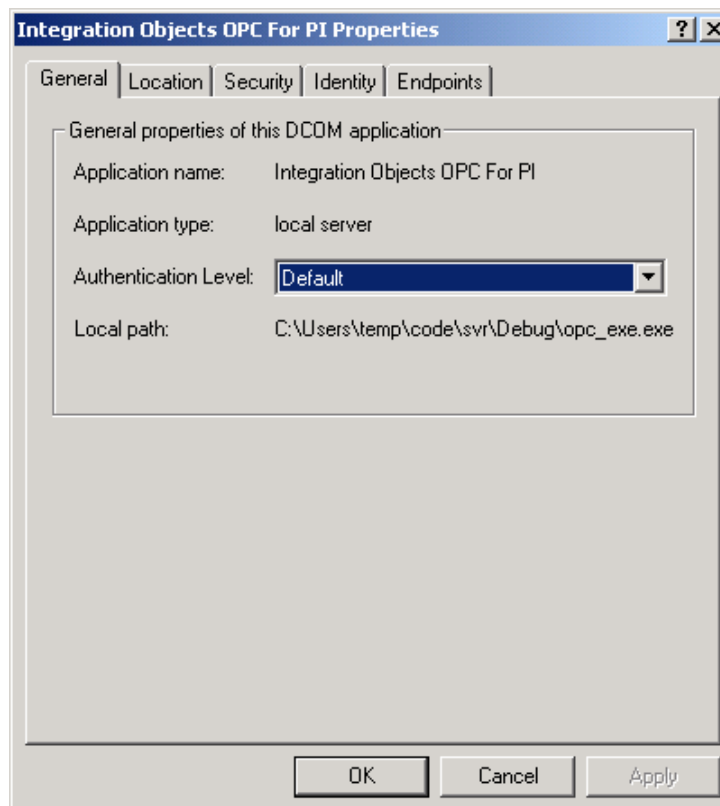
If you are setting up DCOM for the first time, we recommend that you do not change these settings.

- 7 Configure the **Default Protocols** tab as you did on the client side.

## Configuring DCOM Settings for Your OPC Server

To configure DCOM settings for your OPC Server:

- 1 Click the **Application** tab in **DCOM Configuration** dialog and browse until you find the OPC HDA Server of your choice.
- 2 Select the server and either double-click it or choose **Properties** to configure server-specific settings, as follows:
  - a On the **General** tab, we recommend that you leave the Authentication Level to be **Default**:

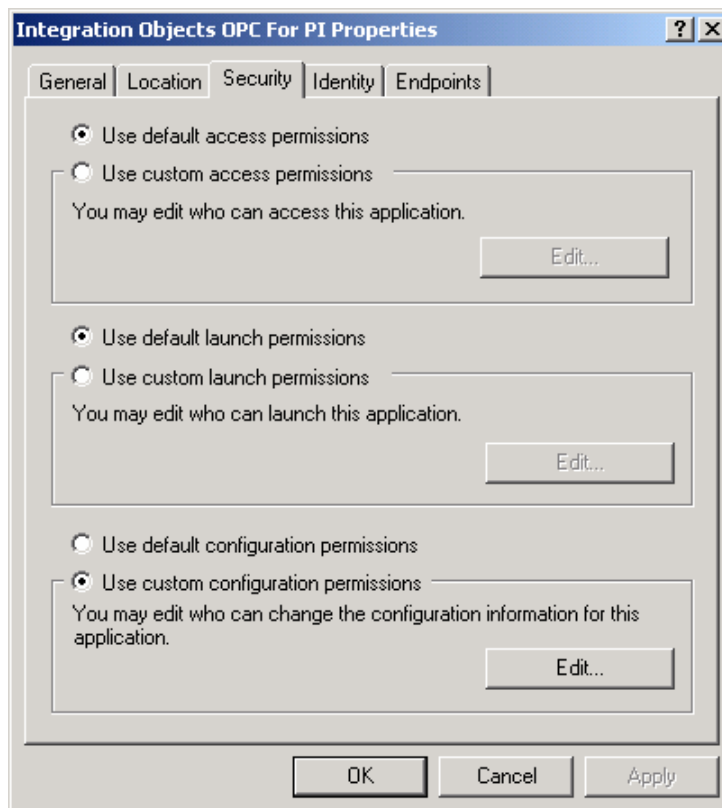


- b On the **Location** Tab, ensure that **Run application on this computer** is the only check box that is checked:



- c On the **Security** Tab, we recommend that you:
- Enable **Use default access permissions**, which means users/groups shown under Default Security tab in the DCOM configuration utility, will have access to connect to this OPC Server.
  - Enable **Use default launch permissions**.
  - The same rules apply about using custom launch permissions here as they do for custom access permissions. If you choose to use the custom permissions to override the defaults, specify which users/groups to which you want to grant permissions

The dialog looks like this:



- d On **Identity** Tab, you specify under what user account you want the OPC HDA Server to run.

This is probably one of the most important settings for the OPC HDA Server, depending on how you will be using your system.

You do not need to configure anything on the **Endpoints** tab.

## Running and Shutting Down G2 OPC HDA Link

### To run G2 OPC HDA Link:

- Start G2 and load the KB named G2-HDA.kb located in the launch subdirectory of the g2opchda directory in your G2 installation directory.

### To shut down the bridge:

- Close the console window or press Ctrl + C in the console window.

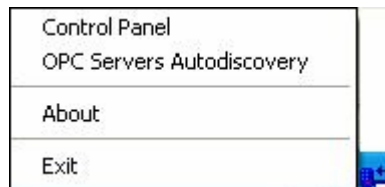
During shutdown, the bridge process closes all connections to OPC Servers and releases any allocated resources.

## Configuring G2 OPC HDA Link at Runtime

G2 OPC HDA Link allows you to configure a set of parameters related to logging, filtering and server status. You can configure these parameters at runtime by using the bridge's HMI or at start-up by editing the configuration file (refer to Appendix I, "Configuration File"). You can also browse for existing OPC HDA servers at runtime.

### To configure G2 OPC HDA Link at runtime:

- 1 Double-click the tray icon of G2 OPC HDA Link to display its menu:



- 2 Choose 'Control Panel' to configure logging and OPC Server status parameters as shown below:



The following table describes all these parameters:

Parameter	Description
Trace level	Select a value for the log level from the combo box. Available options: 0: Only fatal error messages are logged. 1: All critical error messages are logged. 2: All errors are logged. 3: All warnings are logged. 4: All information is logged. 5: All debug information is logged. 9: The highest level.
Log to G2	Check this option to log messages to G2 Message Board as they are logged to log file. Otherwise messages are only logged to file.
Log to screen	Check this option to log messages to screen as they are logged to log file. Otherwise messages are only logged to file.
Archive last log	Check this option to copy the old file to an intermediate file with incremental extension, before being overwritten. Otherwise, any pre-existing log file is erased and overwritten at start-up.
Stop logging	Check this option to stop logging.
Check OPC Server Status	Check this option to enable checking OPC Server status.

Quality Filter	Insert a value for the quality filter, it can be one of this values: 111, 110, 101, 100, 11, 1, 10, 0.
Keep Server connected	Check this option to maintain connection between G2 OPC HDA Link and G2 even the OPC Server status to which the bridge is connected goes to OPCHDA_DOWN.
Frequency	Set the frequency at which the bridge checks the OPC server status (in seconds).

## Browsing OPC Servers at Runtime

To browse for an existing OPC HDA server at runtime:

- 1 Double-click the tray icon to display its menu.
- 2 Choose 'OPC Servers Autodiscovery' to display this dialog:



To browse the network, you click on the “Expand Network” button.





## Starting the bridge as service

### About GService

GService is an utility developed by Gensym to install and manage G2 bridges as a service under Windows NT and Windows 2000. You **must have administrator privileges** in order to use the GService utility. For more details, please refer to G2 Reference Manual (g2refman.pdf).

# Connecting G2 OPC HDA Link

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*Describes how to configure G2 OPC HDA Link and establish a connection.*

## Introduction

G2 connects to G2 OPCHDALink through a `gsi-opchda-interface` object, which references an instance of the `gsi-opchda-interface` class contained in the `g2-hda.kb`. The attributes of the `gsi-opchda-interface` instance specify parameters that define the connection between G2 and G2 OPCHDALink.

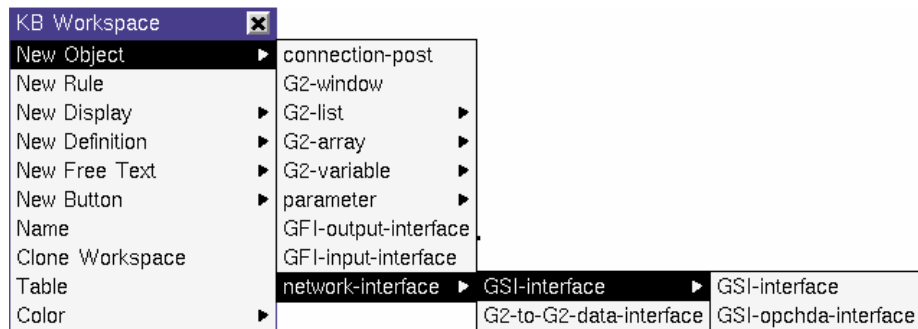
This chapter describes the attributes of a `gsi-opchda-interface` object, their definitions, and strategies for optimizing their settings.

## Attributes of `gsi-opchda-interface`

This interface object collects all the necessary data to initiate a connection. It contains information required by G2, including the network and the remote system.

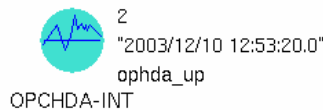
# Creation

To create a gsi-opchda-interface object, you select KB Workspace>New Object>network-interface >GSI-interface>GSI-opchda-interface.



A new instance of GSI-opchda-interface will be created.

Example of GSI-opchda-interface :



The following figure shows an example of a GSI-opchda-interface table.

OPCHDA-INT, a gsi-opchda-interface	
Notes	OK
Item configuration	none
Names	OPCHDA-INT
Identifying attributes	item-id, opc-data-type, gsi-interface-name
Interface warning message level	default to warning message level
Disable interleaving of large messages	no
Interface timeout period	use default
Interface initialization timeout period	unlimited
GSI connection configuration	tcp-ip host "localhost" port-number 22041
External system has a scheduler	no
Poll external system for data	no
Grouping specification	no grouping
Remote process initialization string	"IntegrationObjects.OPCHDA.MSA"
GSI application name	default
GSI interface status	2
Interval to poll external system	use default
Opc server status	opchda_up
Opc server time	"2007/01/26 16:52:50.0"

For GSI-opchda-interface fields description, please refer to **Appendix A**.

## Configuration

To connect to G2 OPC HDA Link, you should configure a GSI-opchda-interface object as follows:

- In the **Names** attribute specify a unique name for the object.
- Change the **GSI connection configuration** to reflect the location of your bridge process.

For example, if the bridge process is running on the local machine and its TCP/IP port number is 22041, then the host name will be "localhost" and connection configuration will be :

```
tcp-ip host "localhost" port-number 22041
```

- **Identifying attributes:** set this attribute to "*item-id, opc-data-type, gsi-interface-name*". *Item-id* and *opc-data-type* are two attributes of *gsi-opchda-item*. The value of *item-id* is used to uniquely identify the variable object to the OPC HDA server variable. The value of *opc-data-type* identifies the *gsi-opchda-item* data type. *gsi-interface-name* is the name of the GSI interface. This attribute is useful to send notification to G2 of the current state and time of the configured OPC server.

- **Remote process initialisation string (RPIS):** A command string that G2 sends to the bridge whenever the bridge is started to select operating options. The string consists in the OPC Server name and the machine name that hosts the requested OPC HDA Server.

Examples of RPIS:

- Connection to the OPC HDA server *IntegrationObjects.OPCHDA.MSA* on the local machine.  
**RPIS** : "IntegrationObjects.OPCHDA.MSA" or "localhost: IntegrationObjects.OPCHDA.MSA".
- Connection to remote OPC HDA Server.  
**RPIS**: "MachineName:OPC.HDAServer.1" where "MachineName" is the machine where the OPC HDA Server is running.  
Also an IP address is accepted.

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### Notes

For more details on *gsi-opchda-interface* configuration, please refer to Appendix A.

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## Connecting G2 to the Bridge Process

To connect G2 to an OPC Server you must first create and configure a `gsi-opchda-interface` object. The G2 OPC HDA Link bridge process connects to the OPC server, using the `remote-process-initialization-string`. The connection is established automatically when you perform the following steps.

### To connect to the bridge:

- 1 Start G2.
- 2 Edit the interface object's `gsi-connection-configuration` attribute to specify the settings required for the connection, described in the `gsi-opchda-interface` attributes table in "Configuration" and "Appendix A".
- 3 Enable the `gsi-opchda-interface` object corresponding to the OPC HDA Link bridge process.

# Accessing OPC Historical Data from G2

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*Describes how to access OPC Historical Data Access Server data from G2.*

## Introduction

G2 OPC HDA Link KB defines new subclasses of GSI variables "gsi-opchda-item" to allow G2 to access data monitored by any OPC HDA Server. Also the bridge defines different RPCs, for browsing OPC HDA Server address space, reading and updating server data.

## Accessing Data from OPC Server

To access data located in an OPC HDA Server, you create instances of `gsi-opchda-item` variable objects in your G2 application.

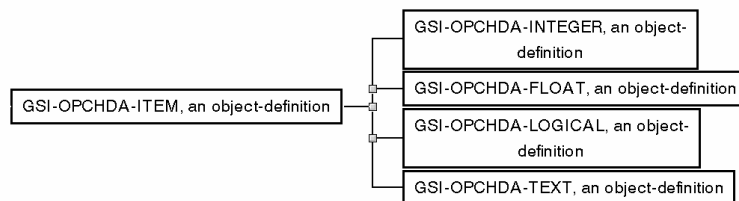
Each `gsi-opchda-item` in your application represents a data source in the OPC HDA Server.

### Class definition

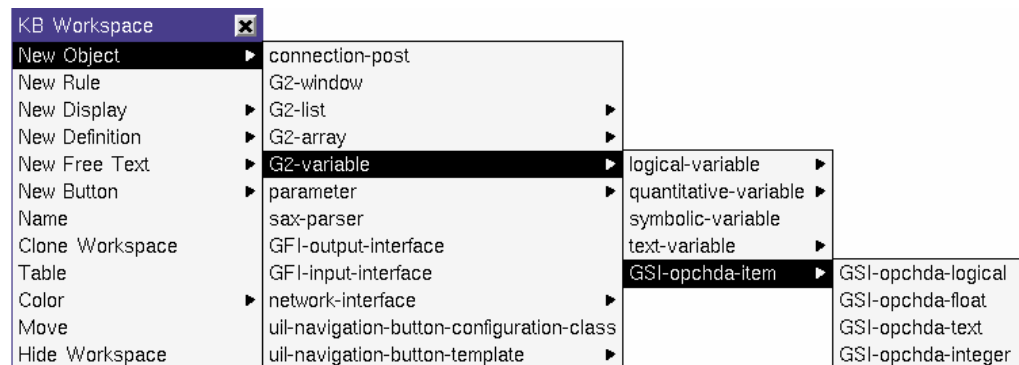
The G2 OPC HDA Link KB defines four (4) subclasses of `gsi-opchda-item`:

- `gsi-opchda-float`: used for floating point quantities.
- `gsi-opchda-integer`: used for integer point quantities.
- `gsi-opchda-text`: used for string point.
- `gsi-opchda-logical`: used for logical (Boolean) point.

Here is the class hierarchy of the `gsi-opchda-item` object:



To create an instance of the `gsi-opchda-item` object, select *KB Workspace > New Object > G2-variable > GSI-opchda-item*.



A new instance of GSI-opchda-item will be created.  
Example of gsi-opchda-item :

```
4  
"SINUSOID"  
87.0, valid indefinitely  
"2003/10/30 08:42:03"
```

## Configuring Variables to Get Data

To configure a variable to get data, you create a class definition that inherits from a gsi-opchda-item subclass and you configure its class-specific attributes.  
For example:

- Item-ID: test:real
- Item Data Type : Float
- GSI interface name: OPCPHD

Then, you create an instance of gsi-opchda-float, set the value of the gsi-interface-name attribute to "OPCPHD", and set the item-ID attribute to "test:real", as shown in the following table:



a gsi-opchda-float	
Options	do not forward chain, breadth first backward chain
Notes	GSI-OPCHDA-FLOAT-XXX-1: OK
Item configuration	none
Names	none
Tracing and breakpoints	default
Data type	quantity
Initial value	none
Last recorded value	87.0, valid indefinitely
History keeping spec	do not keep history
Validity interval	indefinite
Formula	none
Simulation details	no simulation formula yet
Initial value for simulation	default
Data server	GSI data server
Default update interval	30 seconds
GSI interface name	opcphd
GSI variable status	0
Data server for messages	gsi-data-server
Item id	"test:real"
Handle	1
Opc data type	"F"
Value array	a hda-quantity-list
Timestamp array	a float-list
Quality array	an integer-list
Last recorded time	"2003/11/13 12:50:29"

gsi-opchda-item specific attributes

For gsi-opchda-item fields description, please refer to **Appendix B**.

**Time format**

The time format is "YYYY/MM/DD HH:MM:SS.MS".  
 For example the string "2002/11/05 14:07:00.000" represents the following date:  
 November 5, 2002 at 2:07:00 pm. For more details please refer to **Appendix E**.

# Filtering Data Sent to G2 using the GSI Variable Status

In some cases when the quality is bad, the value returned by the OPC Server can corrupt the data history. You can use a quality filter to filters return values, based on the GSI variable status.

For a list of GSI variable status values, see Appendix G, “GSI variables status” on page 72.

For each quality type (Good, Uncertain, Bad), the filter defines three groups. The first contains the list of qualities for which the value is always updated. The second group includes a list of qualities that can be enabled or disabled on demand. The third group includes the list of qualities that do not cause updating. Further, each quality type has two associated levels.

The following table describes when the GSI variable value is updated, based on the quality type, group, and level:

Quality		GSI Status	Level 0	Level 1
Good	Group 1	0	<b>Updated</b>	<b>Updated</b>
	Group 2	506	Not Updated	<b>Updated</b>
	Group 3	555	Not Updated	Not Updated
Bad	Group 1	300, 301, 302, 304, 305, 306, 307	Not Updated	<b>Updated</b>
	Group 2	333	Not Updated	Not Updated
Uncertain	Group 1	404, 405	<b>Updated</b>	<b>Updated</b>
	Group 2	400, 401, 406	Not Updated	<b>Updated</b>
	Group 3	444	Not Updated	Not Updated

The quality filter is composed of three digits, as follows:

<b>This digit...</b>	<b>Corresponds to the filter level (0 or 1) applied to this quality...</b>
First	Good
Second	Bad
Third	Uncertain

The GSI variables that will be updated are those whose GSI status values for each quality (Good, Bad, Uncertain) and each group (Group 1, Group 2, Group 3) show Updated in the specified Level column (Level 0 or Level 1) in the table above.

All combinations of the three digits are possible. Examples include: 100, 101, 111, 001, 011, 010.

The default filter is 111, which updates GSI variables with a status value of 0, 506, 300, 301, 302, 303, 304,305, 306, 307, 404, 405, 400, 401, and 406.

For example, for a quality filter of 100:

<b>This digit...</b>	<b>Corresponds to the filter level applied to this quality...</b>	<b>Which means...</b>
1	Good	Only GSI variables with a status value of 0 (Group 1) or 506 (Group 2) will be updated.
0	Bad	No updates will occur for any bad quality.
0	Uncertain	Only GSI variables with a status value of 404 or 405 (Group 1) will be updated.

For a quality filter of 001:

<b>This digit...</b>	<b>Corresponds to the filter level applied to this quality...</b>	<b>Which means...</b>
0	Good	Only GSI variables with a status value of 0 (Group1) will be updated.
0	Bad	No updates will occur for any bad quality.
1	Uncertain	Only GSI variables with a status value of 404, 405 (Group 1) and 400, 401, or 406 (Group 2) will be updated.



# Remote Procedure Calls

---

*Describes how to access OPC Historical Data Access Server data from G2 using Remote Procedure Calls.*

## Introduction

The G2 OPC HDA Link provides four types of remote procedure calls to manage OPC HDA Server status: browse OPC HDA Server hierarchy, read data, update history and log information.

## Managing OPC Server

### RPC-OPCHDA-GETSERVERLIST

RPC-OPCHDA-GETSERVERLIST
Obtains the list of historian servers. To obtain the list of OPC HDA Servers located on a remote machine, you can use the second declaration.
<b>RPC-OPCHDA-GETSERVERLIST()</b> = ( <i>ids</i> : class text-list) <b>RPC-OPCHDA-GETSERVERLIST( <i>node</i> : text )</b> = ( <i>ids</i> : class text-list)

Argument	Description
<i>node</i>	The machine that holds the requested OPC HDA Servers' list.

Return Value	Description
<i>ids</i>	If you pass the node argument, this value presents the list of registered OPC HDA Servers in the node name. Otherwise, it consists in the list of the program IDs of OPC Servers registered in the machine where the G2 OPC HDA Link bridge process is running.

Example: Returning the list of OPC Servers in the local machine (where G2 OPC HDA Link process is running):

```

Ids : class text-list;
Ids = call RPC-OPCHDA-GETSERVERLIST() across historian1;

```

## RPC-OPCHDA-GETSERVERSTATS

<b>RPC-OPCHDA-GETSERVERSTATS</b>
Retrieves the OPC HDA Server status.
<b>RPC-OPCHDA-GETSERVERSTATS()</b> = ( <i>current-time</i> : float, <i>start-time</i> : float, <i>version</i> : text, <i>vendor</i> : text, <i>Max-ReturnValues</i> : integer, <i>Status</i> : integer , <i>Status-Description</i> : text , <i>error-code</i> : integer)

Return Value	Description
<i>current-time</i>	The current time of the OPC HDA Server in UNIX time.
<i>start-time</i>	The time when the process started in UNIX time.
<i>version</i>	The OPC HDA Server version.
<i>vendor</i>	The vendor information for the OPC Server.
<i>Max-ReturnValues</i>	The maximum number of values that can be returned by the server after a call of ReadRaw. A value of 0 indicates that the server has no limit on the number of values it can return.
<i>Status</i>	The current status of the historian (see Appendix C).
<i>Status-Description</i>	A string explaining historian status when the status value is OPCHDA_INDETERMINATE.
<i>error-code</i>	0: Success. -11: Failure to get the OPC HDA Server status.  For other codes, please review the “Common Error Codes” appendix.



## RPC-OPCHDA-GETITEMATTRIBUTES

This RPC returns the item attributes supported by the OPC server. For more details about standard attributes, you can refer to the OPC HDA specification 1.2. Vendor specific attributes also are supported.

<b>RPC-OPCHDA-GETITEMATTRIBUTES</b>
Obtains the item attributes supported by the historian.
<b>RPC-OPCHDA-GETITEMATTRIBUTES</b> () = ( <i>Count</i> : integer, <i>Attributes-ID</i> : class value-list, <i>Attributes-Name</i> : class text-list, <i>Attributes-Description</i> :class text-list, <i>Attributes-DataType</i> : class integer-list, <i>error-code</i> : integer)

Return Value	Description
<i>Count</i>	The number of item attributes returned.
<i>Attributes-ID</i>	The attribute identification index numbers list.
<i>Attributes-Name</i>	The attribute names list.
<i>Attributes-Description</i>	The attribute descriptions list.
<i>Attributes-DataType</i>	The attribute variant data types list.
<i>error-code</i>	0: Success. -11: Failure to get the attribute list supported by the OPC HDA Server.  For other codes, please review the “Common Error Codes” appendix.

## RPC-OPCHDA-GETAGGREGATES

This RPC returns the item aggregates supported by the OPC server (see Appendix F). Vendor specific aggregates are also supported.

<b>RPC-OPCHDA-GETAGGREGATES</b>
Obtains the list of aggregates supported by the OPC HDA Server.
<b>RPC-OPCHDA-GETAGGREGATES ()</b> = ( <i>Count</i> : integer, <i>Aggregates-ID</i> : class integer-list, <i>Aggregates-Name</i> : class text-list, <i>Aggregates-Desc</i> : class text-list, <i>error-code</i> : integer )

Return Value	Description
<i>Count</i>	The number of aggregates returned.
<i>Aggregates-ID</i>	The aggregate identification index numbers list.
<i>Aggregates-Name</i>	The aggregate names list.
<i>Aggregates-Description</i>	The aggregate descriptions list.
<i>error-code</i>	0: Success. -11: Failed to get the aggregate list supported by the OPC HDA Server.  For other codes, please review the “Common Error Codes” appendix.



## Browsing RPCs

If the OPC HDA Server supports the browsing feature, the client can browse the available data items in the server to obtain the list of the valid definitions for itemIDs. The browse position is initially set to the root of the address space. The client can optionally choose a starting point within a hierarchical space by calling `rpc-opchda-changebrowserposition`. For further information, see the “OPC Common Definition and Interfaces” documentation.

### RPC-OPCHDA-CREATEBROWSER

RPC-OPCHDA-CREATEBROWSER
Initializes the browser object and specifies the filters.
<b>RPC-OPCHDA-CREATEBROWSER</b> ( <i>count</i> : integer, <i>attribute-id</i> : text , <i>operator</i> : integer, <i>Filter</i> ; text) = ( <i>Error-code</i> : integer, <i>Description</i> : Text)

Argument	Description
<i>count</i>	The number of attribute IDs in the filter. If count is equal to 0 then no filtering is used.
<i>attribute-id</i>	The filter attributes IDs.
<i>operator</i>	The filter operators.
<i>Filter</i>	The filter values.

Return Value	Description
<i>Error-code</i>	0: Success. -3: Count argument should be integer. -5: Invalid reference to IOPCHDA_Server. -10: The supplied operator is invalid or unsupported with this attribute or count <> 1 -11: The Operation was unsuccessful. -29: The server does not support this attribute. -30: The supplied value for the attribute is not a correct data type. -31: The server does not support this filter.  For other codes, please review the “Common Error Codes” appendix.
<i>Description</i>	A description of the error-code.

## RPC-OPCHDA-GETBROWSERBRANCHES

### RPC-OPCHDA-GETBROWSERBRANCHES

Returns a list of available branches at the current position. The filters (Filter Criteria, Data type and Access Right) are not applied to this RPC. If the server address space is flat, this RPC will return an empty list.

**RPC-OPCHDA-GETBROWSERBRANCHES () = ( Branches : class text-list )**

Return Value	Description
<i>Branches</i>	The branches available at the current browse position.

## RPC-OPCHDA-GETBROWSERLEAVES

### RPC-OPCHDA-GETBROWSERLEAVES

This RPC returns the list of leaves available at the current position. The position from which the browse is done can be set via **rpc-opchda-changebrowserposition**.

The list of returned values depend on the applied filter; if no filter is applied, this RPC will return all the available leaves contained at the current level. An empty list will be returned if no leaves are found.

**RPC-OPCHDA-GETBROWSERLEAVES () = ( Leaves : class text-list )**

Return Value	Description
<i>Leaves</i>	The leaves available at the current browse position.

## RPC-OPCHDA-CHANGEBROWSERPOSITION

### RPC-OPCHDA-CHANGEBROWSERPOSITION

Provides a way to move through the server hierarchy. There are two ways to use this RPC: moving "up" or "down" in the hierarchy or moving "to" a specified level.

**RPC-OPCHDA-CHANGEBROWSERPOSITION** (*direction*: truth-value, *branch-name*: text) = (*error-code* : integer )

**RPC-OPCHDA-CHANGEBROWSERPOSITION** (*level*: integer, *branch-name*: text)

Argument	Description
<i>direction</i>	The direction to browse: <ul style="list-style-type: none"> <li>• Up if <i>direction</i> is false.</li> <li>• Down if <i>direction</i> is true.</li> </ul>
<i>level</i>	Indicates the number of levels to move in the hierarchy. <ul style="list-style-type: none"> <li>- 0 to move to a branch in the same level.</li> <li>- A negative integer is used to move down through the hierarchy.</li> <li>- A positive integer to move up.</li> </ul>
<i>branch-name</i>	The name of the branch to move into, which would be one of the strings returned by <code>rpc-opchda-getitemid</code> .

Return Value	Description
<i>error-code</i>	0 : Success. -6 : Invalid browser reference. -11: Call failed.  For other codes, please review the "Common Error Codes" appendix.

## RPC-OPCHDA-GETITEMID

### RPC-OPCHDA-GETITEMID

Provides a way to get fully qualified item identification.

**RPC-OPCHDA-GETITEMID** (*Item-name* : text) = (*Item-Id* : text)

Argument	Description
<i>Item-name</i>	The name of a branch or leaf at the current level.

Return Value	Description
<i>Item-ID</i>	The fully qualified item ID.

## Read DATA

Functions provided by G2 OPC HDA Link to read history data are called in respect to the following timestamp definition formats:

YYYY/MM/DD HH:MM:SS

YYYY/MM/DD HH:MM:SS.mmm

Where:

YYYY is a four-digit year

MM is a two-digit month

DD is a two-digit day

HH is a two-digit hour in 24-hour format

MM is a two-digit minute

SS is a two-digit second

mmm is a one to three digit millisecond

Example : 2003/10/23 10:14:58.000

However, you can use string date such as NOW and NOW-1Y, if the HDA OPC server supports them (see Appendix E String Format of the time).

### RPC-OPCHDA- READ-ATTRIBUTE

<b>RPC-OPCHDA-READ-ATTRIBUTE</b>
Reads the attribute value and time stamp from the history database associated with a given OPC item.
<b>RPC-OPCHDA-READ-ATTRIBUTE</b> ( <i>item-handle</i> : integer, <i>start-time</i> : text, <i>End-time</i> : text, <i>Attr-ID</i> : integer) = ( <i>Attr-timestamp</i> : text, <i>Attr-Value</i> : text, <i>Error-code</i> : integer, <i>Error-Desc</i> : text )



<b>Argument</b>	<b>Description</b>
<i>Item-handle</i>	Identifies the handle of GSI-OPCHDA-ITEM object to be read.
<i>start-time</i>	Specifies the beginning of the history period to be read.
<i>End-time</i>	Specifies the end history period to be read.
<i>Attr-ID</i>	The attribute ID to be read. You can use the RPC-OPCHDA-GETITEMATTRIBUTES RPC to retrieve the list of attributes ids supported by the OPC HDA server.

<b>Return Value</b>	<b>Description</b>
<i>Attr-timestamp</i>	The attribute timestamp.
<i>Attr-Value</i>	The attribute value.
<i>Error-code</i>	0: Success. 4: No history available for attribute. -5: Sync Read interface failed. -10: An invalid argument was passed. -11: The read was unsuccessful. -13: The attribute ID is not valid. -21: The item/attribute is not readable.  For other codes, please review the “Common Error Codes” appendix.
<i>Error-Desc</i>	A description of the error message.

## RPC-OPCHDA- READ-RAW

<b>RPC-OPCHDA-READ-RAW</b>
Reads item values, qualities, and timestamps from history database for the specified time domain.
<b>RPC-OPCHDA-READ-RAW</b> ( <i>item-handle</i> : integer, <i>start-time</i> : text, <i>End-time</i> : text, <i>count</i> : integer, <i>Bound</i> : Boolean) = ( <i>error-code</i> : integer, <i>description</i> : text )

Argument	Description
<i>Item-handle</i>	Identifies the handle of GSI-OPCHDA-ITEM object to be read.
<i>start-time</i>	Specifies the beginning of the history period to be read.
<i>End-time</i>	Specifies the end history period to be read.
<i>count</i>	The maximum number of values returned for any item over the time range.
<i>Bound</i>	True if bounding values should be returned. False if no bounding values are requested.

Return Value	Description
<i>error-code</i>	0: Success. 2: More data is available in the time range beyond the number of values requested. 7: No data was found in the specified time range. -5: SynchRead interface is not available. -10: An invalid argument was passed. -11: The read was unsuccessful. -16: The maximum number of values returned by the server was exceeded. -21: The item is not readable.  For other codes, please review the “Common Error Codes” appendix.
<i>description</i>	A description of the error-code.

**Example:**

To retrieve from the historian 25 values recorded during the last year, for the point referenced by HDAVAR1:

*error-code: integer;*

*description: text;*

...

*error-code ,description = rpc-opchda-read-raw(the Handle of HDAVAR1,"NOW-1Y" , "NOW" , 25, FALSE) across Historian1;*

**RPC-OPCHDA- READ-PROCESSED**

*The following RPC is optional (according to OPC HDA specification)*

<b>RPC-OPCHDA- READ -PROCESSED</b>
Computes the aggregate values, qualities, and timestamp from history database for the specified time domain.
<b>RPC-OPCHDA- READ -PROCESSED</b> ( <i>Item-handle</i> : integer, <i>start-time</i> : text, <i>End-time</i> : text, <i>Resample-interval</i> : text, <i>count</i> : integer, <i>Aggregate</i> : text) = ( <i>error-code</i> : integer, <i>description</i> : text )

<b>Argument</b>	<b>Description</b>
<i>Item-handle</i>	Identifies the handle of GSI-OPCHDA-ITEM object to be read.
<i>start-time</i>	Specifies the beginning of the history period to be read.
<i>End-time</i>	Specifies the end history period to be read.
<i>Resample-interval</i>	Interval between returned values.
<i>Aggregate</i>	The calculation to be performed on the raw data (see Appendix F).

Return Value	Description
<i>error-code</i>	0: Success. 3: More data is available than returned (there are other timestamps). 7: No data was found in the specified time range. -5: SynchRead interface is not available. -9: This server does not support ReadProcessed. -10: An invalid argument was passed. -11: The read was unsuccessful. -15: The requested attribute is not available from the provided item. -16: The maximum number of values returned by the server was exceeded. -21: The item is not readable.  For other codes, please review the “Common Error Codes” appendix.
<i>description</i>	A description of the error-code.

**Example:**

```

error-code: integer;
description: text;
...
error-code ,description = rpc-opchda-read-processed(the Handle of
HDAVAR1,"2003/01/15 00:00:00.000", "2003/07/15 00:00:00.000", 60,25,
"OPCHDA_MINIMUM")
  
```

This call passes a request to the OPC server to retrieve processed (minimum) values from 25 values recorded, between midnight January 15, 2003 and midnight July 15, 2003 for the OPC variable that is referenced by the G2 variable HDAVAR1.

**NOTE**

The supported aggregate list can be obtained using the RPC `rpc-opchda-getaggregates`



## RPC-OPCHDA- READ-ATTIME

The following RPC is optional (according to OPC HDA specification)

<b>RPC-OPCHDA- READ -ATTIME</b>
Reads item value and quality from history database for the specified timestamp.
<b>RPC-OPCHDA- READ -ATTIME</b> ( <i>item-handle</i> : integer, <i>time-stamp</i> : text) = ( <i>error-code</i> : integer, <i>description</i> : text )

Argument	Description
<i>Item-handle</i>	Identifies the handle of GSI-OPCHDA-ITEM object to be read.
<i>Time-stamp</i>	Specifies the timestamp for the requested data.

Return Value	Description
<i>error-code</i>	0: Success. 2: More data is available in the time range beyond the number of values requested. 7: No data was found in the specified time range. -5: SynchRead interface is not available. -9: This server does not support ReadAtTime. -10: An invalid argument was passed. -11: The read was unsuccessful. -21: The item is not readable.  For other codes, please review the "Common Error Codes" appendix.
<i>description</i>	A description of the error-code.

### Example:

*error-code*: integer;

*description*: text;

...

*error-code* , *description* = rpc-opchda-read-attime(the Handle of HDAVAR1,"2006/10/10 12:00:00") across Historian1;

This call passes a request to the Historian OPC server to retrieve the current value for the OPC variable that is referenced by the G2 variable HDAVAR1.

## RPC-OPCHDA- READ-MODIFIED

The following RPC is optional (according to OPC HDA specification)

RPC-OPCHDA-READ-MODIFIED
This function reads the values, qualities, and timestamp of the modification from the history database for the specified time domain.
<b>RPC-OPCHDA-READ-MODIFIED</b> ( <i>item-handle</i> : integer, <i>start-time</i> : text, <i>End-time</i> : text, <i>count</i> : integer) = ( <i>error-code</i> : integer, <i>description</i> : text)

Argument	Description
<i>item-handle</i>	Identifies the handle of GSI-OPCHDA-ITEM object to be read.
<i>start-time</i>	Specifies the beginning of the history period to be read.
<i>End-time</i>	Specifies the end history period to be read.
<i>Count</i>	The maximum number of values returned for this item over the time range.

Return Value	Description
<i>error-code</i>	0: Success. 3: More data is available than returned (there are other timestamps). 7: No data was found in the specified time range. -5: SynchRead interface is not available. -9: This server does not support ReadModified. -10: An invalid argument was passed. -11: The read was unsuccessful. -21: The item is not readable.  For other codes, please review the “Common Error Codes” appendix.
<i>description</i>	A description of the error-code.

## Update DATA

This section presents the RPCs provided by G2 OPC HDA Link to update history data. Update data RPCs use timestamps to the following timestamp definition formats:

YYYY/MM/DD HH:MM:SS

YYYY/MM/DD HH:MM:SS.mmm

Where:

YYYY is a four-digit year

MM is a two-digit month

DD is a two-digit day

HH is a two-digit hour in 24-hour format

MM is a two-digit minute

SS is a two-digit second

mmm is a one to three digit millisecond

Example : 2003/10/23 10:14:58.000

## RPC-OPCHDA-QUEARYCAPABILITIES

<b>RPC-OPCHDA-QUEARYCAPABILITIES</b>
Currently, query only synchronous update capabilities supported by the OPC HDA Server.
<b>RPC-OPCHDA-QUERYCAPABILITIES</b> ( <i>Flag</i> :integer) = ( <i>error-code</i> : integer, <i>description</i> : text, <i>Capabilities</i> : integer-list )

Argument	Description
<i>Flag</i>	Identifies the HDA interface of which you want to query capabilities. Currently, the synchronous update is the only supported interface. Possible value: 0

Return Value	Description
<i>Error-code</i>	0: Success. -5: SynchUpdate interface is not available. -9: This server does not support the QueryCapabilities function. -10: An invalid argument was passed. -11: The function was unsuccessful.  For other codes, please review the “Common Error Codes” appendix.
<i>Error-Desc</i>	A description of the error message.
<i>Capabilities</i>	The list of synchronous update capabilities if the operation succeeds.

## RPC-OPCHDA-UPDATE

<b>RPC-OPCHDA-UPDATE</b>
Update the history for a given HDA item handle. You can insert a new value, replace the value at an existing timestamp.
<b>RPC-OPCHDA-UPDATE</b> ( <i>item-handle</i> : integer, <i>update-time</i> : text, <i>Value</i> : text, <i>Quality</i> : integer, <i>Flag</i> : integer) = ( <i>error-code</i> : integer, <i>description</i> : text )

Argument	Description
<i>Item-handle</i>	Identifies the handle of GSI-OPCHDA-ITEM object to be updated.
<i>update-time</i>	Specifies the time of Insert, Replace or InsertReplace of the given item value.
<i>Value</i>	The value to insert or replace (depend on the given flag) in the history database.
<i>Quality</i>	The quality to insert or replace (depend on the given flag) in the history database. It is the OPC Data Access quality.
<i>Flag</i>	Available options: 0: <b>Insert</b> : inserts value, quality in the history database at the specified timestamp for the given item. 1: <b>Replace</b> : replace value and quality in the history at an existing timestamp for the given item. 2: <b>InsertReplace</b> : inserts or replaces value and quality in the history database for the specified timestamp for the given item. If the item has a value at the specified timestamp, the new value and quality will replace the old one.



Return Value	Description
<p><i>error-code</i></p>	<p>0: Success.            -5: the SynchUpdate interface is not available.-9: This server does not support this function.            -10: An invalid argument was passed.            -11: The function was unsuccessful for unknown reason.            -21: Insufficient rights for this operation.</p> <p><b><u>Specific error code for the Insert operation:</u></b></p> <p>-14: Unable to insert - data already present.</p> <p><b><u>Specific error code for the Replace operation:</u></b></p> <p>-12: Unable to replace - no data exists.</p> <p><b><u>Specific error code for the InsertReplace operation:</u></b></p> <p>6: The requested insert occurred.            5: The requested replace occurred.            You can get also one of the following error codes:            -28: The variant type vt is not a valid type of variant.            -27: The data pointed to by pvarSrc does not fit in the destination type            -26: The argument could not be coerced to the specified type.            -25: Memory could not be allocated for the conversion</p> <p>For other codes, please review the “Common Error Codes” appendix.</p>
<p><i>description</i></p>	<p>A description of the error-code.</p>

### Example:

#### 1- Insert

```
error-code: integer;  
description: text;  
...  
error-code ,description = call RPC-OPCHDA-Update(the Handle of  
HDAVAR1,"2006/10/10 12:00:00", "14", 192, 0) across historian1;
```

This call passes a request to the Historian OPC server to insert the value 14 and the quality 192 at the timestamp "2006/10/10 12:00:00" for the OPC variable that is referenced by the G2 variable HDAVAR1.

#### 2- Replace

```
error-code: integer;  
description: text;  
...  
error-code ,description = call RPC-OPCHDA-Update(the Handle of  
HDAVAR1,"2006/10/10 12:00:00", "15", 192, 1) across historian1;
```

This call passes a request to the Historian OPC server to replace the OPC variable referenced by the G2 variable HDAVAR1 value to 15 and the quality 192 at the timestamp "2006/10/10 12:00:00".

#### 3- InsertReplace

```
error-code: integer;  
description: text;  
...  
error-code ,description = call RPC-OPCHDA-Update(the Handle of  
HDAVAR1,"2006/10/10 12:10:00", "10", 192, 2) across historian1;
```

This call passes a request to the Historian OPC server to insert/replace the value 10 and the quality 192 at the timestamp "2006/10/10 12:10:00" for the OPC variable that is referenced by the G2 variable HDAVAR1.

### Note

Qualities codes are presented in the Appendix H. In Updates, the bridge uses the OPC quality code (*Example: 192 means 'Good, Non-Specific, Not limited'*). However, qualities returned by Read RPCs presents the g2 variable status calculated from the OPC quality (see Appendix G). For example, if you insert a value with quality of 192, you will get the quality of 0 after a ReadRaw call.

## RPC-OPCHDA- DELETE-RAW

<b>RPC-OPCHDA-DELETE-RAW</b>
This function deletes the values, qualities, and timestamps from the history database for the specified time domain for the given item.
<b>RPC-OPCHDA-DELETE-RAW</b> ( <i>Item-handle</i> : integer, <i>start-time</i> : text, <i>End-time</i> : text) = ( <i>error-code</i> : integer, <i>description</i> : text )

Argument	Description
<i>Item-handle</i>	Identifies the handle of GSI-OPCHDA-ITEM object to be read.
<i>start-time</i>	Specifies the beginning of the history period to be deleted.
<i>End-time</i>	Specifies the end history period to be deleted.

Return Value	Description
<i>error-code</i>	0: Success. 7: No values to delete for the item in the specified time range. -5: SynchUpdate interface is not available. -9: This server does not support DeleteRaw. -10: An invalid argument was passed. -11: The Item delete was unsuccessful. -21: Insufficient rights for this operation.  For other codes, please review the “Common Error Codes” appendix.
<i>description</i>	A description of the error-code.



## RPC-OPCHDA-DELETE-ATTIME

<b>RPC-OPCHDA-DELETE-ATTIME</b>
This function deletes the values and qualities in the history database for the specified timestamp for the given item.
<b>RPC-OPCHDA- READ -ATTIME</b> ( <i>item-handle</i> : integer, <i>time-stamp</i> : text) = ( <i>error-code</i> : integer, <i>description</i> : text )

Argument	Description
<i>Item-handle</i>	Identifies the handle of GSI-OPCHDA-ITEM object to be read.
<i>Time-stamp</i>	Specifies the timestamp for the requested data.

Return Value	Description
<i>error-code</i>	0: Success. 7: No value matching time given to delete. -5: SynchUpdate interface is not available. -9: This server does not support DeleteAtTime. -10: An invalid argument was passed. -11: The Item delete was unsuccessful. -21: Insufficient rights for this operation.  For other codes, please review the "Common Error Codes" appendix.
<i>description</i>	A description of the error-code.

## Configuration RPCs

The following RPCs allow the configuration of logging and quality filter parameters of the bridge.

### rpc-opchda-set-tracelevel

Sets the level of message tracing.

#### Synopsis

```
rpc-opchda-set-tracelevel  
  (trace-level: integer)  
  -> error-code: integer
```

<b>Argument</b>	<b>Description</b>
<i>trace-level</i>	The trace level. The options are: 0: Log fatal error messages; whenever this error occurs, the context is shutdown. 1: Log the critical error messages. 2: Log error messages. 3: Log warning messages. 4: Log information messages. 5: Log debug messages. 9: Log all information. The default value is trace level 0.
<b>Return Value</b>	<b>Description</b>
<i>error-code</i>	0: Success. For other codes, please review the "Common Error Codes" appendix.

#### Example

To set the trace level to its highest value:

```
ErrorCode = call rpc-opchda-set-tracelevel(4)
```

## rpc-opchda-tracestart

Starts the trace log.

### Synopsis

```
rpc-opchda-tracestart  
( )  
-> error-code: integer
```

<b>Return Value</b>	<b>Description</b>
<i>error-code</i>	0: Success. -11: Failed to start trace logging. For other codes, please review the "Common Error Codes" appendix.

### Example

To start trace logging:

```
ErrorCode = call rpc-opchda-tracestart ()
```

## rpc-opchda-tracestop

Stops trace logging.

### Synopsis

```
rpc-opchda-tracestop  
( )  
-> error-code: integer
```

<b>Return Value</b>	<b>Description</b>
<i>error-code</i>	0: Success. -11: Failed to stop trace logging. For other codes, please review the "Common Error Codes" appendix.

### Example

To stop trace logging:

```
ErrorCode = call rpc-opchda-tracestop ()
```

## rpc-opchda-trace-to-g2

Displays log messages in G2.

### Synopsis

```
rpc-opchda-trace-to-g2  
  (display-in-g2: truth-value)  
  -> error-code: integer
```

<b>Argument</b>	<b>Description</b>
<i>display-in-g2</i>	true: Display log messages in G2 Message Board.  false: Stop displaying log messages in G2.  The default value is false.

<b>Return Value</b>	<b>Description</b>
<i>error-code</i>	0: Success.  For other codes, please review the "Common Error Codes" appendix.

## rpc-opchda-trace-to-stdout

Displays log message in the G2 OPCHDALink bridge console.

### Synopsis

```
rpc-opchda-trace-to-stdout  
  (display-in-console: truth-value)  
  -> error-code: integer
```

<b>Argument</b>	<b>Description</b>
<i>display-in-console</i>	true: Display log messages in the console.  false: Stop displaying log messages in the console.  The default value is false.

<b>Return Value</b>	<b>Description</b>
<i>error-code</i>	0: Success.  For other codes, please review the "Common Error Codes" appendix.

## rpc-opchda-set-qualityfilter

This RPC sets the filtering level of values returned to G2.

<b>RPC-OPCHDA-SET-QUALITYFILTER</b>
Sets the filtering level of values returned to G2
<b>RPC-OPCHDA-SET-QUALITYFILTER</b> ( <i>quality-filter-level: integer</i> ) = ( <i>error-code: integer</i> )

Argument	Description
<i>quality-filter-level</i>	The filter level to be applied to the GSI variable status.

Return Value	Description
<i>error-code</i>	<p>0: Success.</p> <p>1: Invalid <i>quality-filter-level</i> value.</p> <p>-1: Failed to set the <i>quality-filter-level</i> value.</p> <p>-2: Invalid number of arguments.</p> <p><b>Note:</b> When <i>error-code</i> differs from 0, the old value is kept.</p>

### Example

If you update only those GSI variables with the status of 0, 506, 404, or 405, you would set the quality filter level to 100, as follows:

- For a Good quality, to update only 0 and 506, you set the filter level to 1.
- For a Bad quality, you set the filter level to 0 for no updates.
- For an Uncertain quality, to update only 404 and 405, you set the filter level to 0.

For more information on how to specify the quality filter, see “Filtering Data Sent to G2 using the GSI Variable Status” on page 34.

The RPC call looks like this:

```
error-code: integer;
error-code = call rpc-opchda-set-qualityfilter(100)
```

# Appendixes

## Appendix A. GSI-opchda-interface attributes

The interface object collects all the necessary data to initiate a connection. It contains information required by G2, including the network and the remote system.

Attribute	Description
<b>Names</b>	The name of the interface object, which must be unique. Since this object represents the connection to a particular G2 OPCHDALink bridge process, you can choose a name that associates it with the OPC Server.  <i>Allowable values:</i> Any symbol <i>Default value:</i> none
<b>Identifying-attributes</b>	Uniquely identifies the variable objects in the OPC HDA Server.  <i>Allowable values:</i> A list of symbols <i>Default value:</i> Item-id,opc-data-type, gsi-interface-name  <i>Notes:</i> The value of <b>identifying-attributes</b> should always be: <b>item-id</b> and <b>opc-data-type</b> , which are attributes of <b>gsi-opchda-item</b> object. Besides, you specify the GSI interface name attribute <b>gsi-interface-name</b> .
<b>Interface-warning-message-level</b>	Sets the severity level for error and warning messages that G2 provides for the interface object.  <i>Allowable values:</i> 0: No warning or error messages. 1: Serious error messages only. 2: All error messages. 3: All error and warning messages. Level 0 is the lowest severity level and provides the least error information. Increasing the warning message level causes G2 to provide more information about errors and failures that are otherwise only detectable through the value of the <b>gsi-interface-status</b> attribute. Messages are posted to the Operator Logbook by default. For example, when the warning message level is at 0 or 1, a failure to connect to a bridge causes the <b>gsi-interface-status</b> to change to -2 (Error), but no information is made available about why the failure occurred.

*Default value:* **default to warning message level:**

The interface-warning-message-level takes on the value of the warning-message-level attribute in the **Debugging Parameters** system table.

Attribute	Description
<b>disable-interleaving-of-large-messages</b>	Controls whether G2 Gateway interleaves, or changes the transmission order of message packets

*Allowable values:* **yes, no**

*Default value:* **no**, which means:

- G2 transmits messages in packets. A large message occupies several packets. A small message occupies a single packet.
- When more than one message requires transmission across an interface, G2 interleaves the packets that constitute the messages.

<b>interface-timeout-period</b>	The length of time G2 will wait for a response from the bridge before logging an error. A reasonable setting depends on how busy your network is and other factors. A good starting value is between 10 and 20 seconds. The minimum setting is 1 second.
---------------------------------	--

*Allowable values:* **integer seconds**

*Default value:* **use default**, which uses a default of 1 second

*Notes:* See interface-initialization-timeout-period.

<b>Interface-initialization-timeout-period</b>	Specifies how long G2 waits to initialize a connection using Gensym (ICP) protocols. The following timeout intervals apply to GSI interfaces:
--	---

- Establish a connection.
- Initialize the connection.
- Wait for a response.

This attribute applies to the second interval. The interface-timeout-period attribute specifies the timeout period for the first and third intervals.

*Allowable values:* An integer specifying some number of seconds.  
**unlimited:** The initialization interval never times out.

**use default:** The interface-initialization-timeout-period is the same as the interface-timeout-period.

*Default value:* **unlimited**

Attribute	Description
-----------	-------------

<b>gsi-connection-configuration</b>	<p>A G2 expression that describes the network connection between G2 and the G2 OPCHDALink bridge process. The expression specifies the type of network (DECnet or TCP/IP) and the network address of the bridge process.</p> <p><i>Allowable values:</i> tcp-ip host "<i>host</i>" port-number <i>port-number</i> where: "<i>host</i>" is the name of the machine that runs the bridge process. Note that the host name is enclosed in double quotation and may be the IP address of the machine. <i>port-number</i> is the TCP/IP port number of the bridge. It is set either from the command line that started the bridge process or in the code for the function <code>getgsiport()</code>. The default port number is 22041. You can change it to any number from 3001 to 29999 that you are not using for another process on that machine.</p> <p><i>Default value:</i> tcp-ip host "localhost" port-number 22041</p>
<b>external-system-has-a-scheduler</b>	<p>Determines whether scheduling for getting new data values is the responsibility of the OPC HDA Server or G2.</p> <p><i>Allowable values:</i> yes: G2 assumes that the G2 Gateway user code handles the return of data to G2, without explicit requests from G2. no: G2 Gateway continuously reads a queue of requests for data from G2.</p> <p><i>Default value:</i> no</p> <p><i>Notes:</i> The value of this attribute depends on the communication mode between the bridge and the OPC HDA Server. In this version only synchronous mode is supported. This attribute is always set to no.</p>
<b>poll-externalsystem-for-data</b>	<p>Determines whether the G2 Gateway bridge receives unsolicited data from the external system by executing the callback function <code>gsi_g2_poll()</code> every cycle.</p> <p><i>Allowable values:</i> yes: The G2 Gateway bridge calls <code>gsi_g2_poll()</code> every cycle. no: The G2 Gateway bridge does not call <code>gsi_g2_poll()</code>.</p> <p><i>Default value:</i> no</p> <p><i>Notes:</i> This attribute should always be set to no.</p>
<b>Grouping-specification</b>	<p>(Optional) Enables you to group requests for data service using one or more of the identifying attributes of a variable.</p> <p><i>Allowable values:</i> no grouping</p> <p><i>Default value:</i> no grouping</p> <p><i>Notes:</i> This attribute should always be set to no grouping.</p>
<b>Attribute</b>	<b>Description</b>
<b>remote-process-initialization-string</b>	<p>A command string that G2 sends to the bridge whenever the bridge is started to select operating options. The string consists of the name of OPC HDA Server.</p>



*Allowable values:* The syntax of the remote process initialization string is as follows: "[\\*hostname*:]*server-name*" where:  
*hostname*: The node name where the server is running.  
*server-name*: The name of the OPC Server  
For example: "IntegrationObjects.OPC.PI"  
To connect G2 OPCHDALink to a remote OPC HDA Server, you can specify the node name in the remote process initialization string.  
For example, if the OPC HDA Server named IntegrationObjects.OPC.PI is running on MachineA, and its IP address is 65.108.62.138, the remote process initialization string can be one of the following:  
"MachineA:IntegrationObjects.OPC.PI"  
or  
"\\MachineA:IntegrationObjects.OPC.PI"  
or  
"65.108.62.138:IntegrationObjects.OPC.PI"  
**Note:** For remote OPC HDA Server connection, the OPC Server should be registered in the machine on which the bridge is running.

*Default value:* None

*Notes:* If the *remote-process-initialization-string* is empty, only remote procedures can be used for displaying the available OPC Servers.  
If the name of the OPC Server contains space characters, the name must be enclosed in hash-marks (#).  
For example:  
"#Integration Objects.PI.OPC#"   
or  
"#\\MachineA:Integration Objects.PI.OPC#"

**gsi-interface-status** The current connection status.

*Allowable values:* 2 (OK): The connection between the G2 process and the bridge process is successful and being maintained.  
1 (Initializing): The OPC system is initializing.  
When G2 receives this code, it suspends sending messages to the bridge process until it receives an OK code.  
0 (Waiting): The interface is either disabled or inactive.  
-1 (Timeout): The G2 process has not heard from the bridge process within the *interface-timeout-period* specified for the interface object. The connection has timed out. This code may also indicate that a communication overload has occurred. An alarm condition is not necessary, since the bridge status usually returns to 2 without intervention.  
-2 (Error): An error condition occurred. The connection between G2 and the G2 OPCHDALink bridge process has been interrupted.

*Default value:* None

*Notes:* If the bridge cannot establish a connection to the OPC HDA Server, the GSI interface status is automatically set to (-2). This may occur when a wrong OPC Server name is supplied.

**interval-to-poll-external-system**

Controls the polling interval. The value of this attribute is not supported when poll-external-system-for-data is set to no.

*Allowable values:* A time interval.

*Default value:* None

**opc-server-status**

Describes the possible values for the OPC HDA Server Status, see appendix C for further details.

*Default value:* None

**opc-server-time**

The current time of the OPC HDA Server.

*Default value:* “ “

To enable updating the attributes opc-server-status and opc-server-time, you need to put the NotifyG2 flag to TRUE in the ConfigFile.ini (refer to Appendix I, “Configuration File”) and to implement in the kb a procedure named ‘G2-OPC-SET-CONNECTION-STATUS’, see appendix K for further details.

## Appendix B. GSI-opchda-item attributes

The *gsi-opchda-items* allows g2 applications to manipulate historical values of OPC HDA Server variables.

<b>Attribute</b>	<b>Description</b>
<b>Names</b>	Specifies the variable name <i>Allowable values:</i> Any symbol <i>Default value:</i> none
<b>Data type</b>	Specifies the variable data type. <i>Allowable values:</i> Integer, Text, Truth-value, Float <i>Default value:</i> none
<b>Data server</b>	The data server for this variable. <i>Allowable values:</i> GSI-data-server. <i>Default value:</i> GSI-data-server.
<b>GSI interface name</b>	The name of GSI-OPCHDA-INTERFACE
<b>Last recorded value</b>	The current value of OPC HDA item.
<b>default-update-interval</b>	Specifies a regular time interval at which G2 obtains a value for this variable. <i>Allowable values:</i> Any non-negative number <i>Default value:</i> none
<b>Item-Id</b>	The item id of the variable, used to uniquely identify it.
<b>GSI variable status</b>	Status of data point.
<b>Handle</b>	The bridge handle of variable. This attribute is used by RPCs to obtain history.
<b>Opc-data-type</b>	This value is given by the <i>gsi-opchda-item</i> , (T) <i>gsi-opchda-text</i> , (I) <i>gsi-opchda-integer</i> , (F) <i>gsi-opchda-float</i> and (L) <i>gsi-opchda-logical</i>
<b>Value-Array</b>	The name of the list that contains the variable history.
<b>Timestamp-Array</b>	The name of the list that contains the timestamp corresponding to each of the values contained in the <i>Value-Array</i> attribute.
<b>Quality-Array</b>	The name of the list that contains the quality corresponding to each of the values contained in the <i>Value-Array</i> attribute.

## Appendix C. OPC Server Status Code

The following table describes the possible values for the OPC HDA Server Status. (Historical Data Access Custom Interface Standard Version 1.1 section 5.3.13)

<b>Status</b>	<b>Description</b>
<b>OPCHDA_UP</b>	The historian is running.
<b>OPCHDA_DOWN</b>	The historian is not running.
<b>OPCHDA_INDETERMINATE</b>	The status of the historian is indeterminate. See the description message returned by <b>RPC-OPCHDA-GETSERVERSTATS</b> for further information.

### **G2-OPCHDALink specific status**

<b>Status</b>	<b>Description</b>
<b>NOT-CONNECTED</b>	There is no connection to the OPC server.
<b>FAILED</b>	This indicates that the call to get OPC server status fails.
<b>UNKNOWN</b>	The OPC server status does not show up in the OPC standard status.

## Appendix D. OPCHDA Operators

The following table describes the possible values for the OPCHDA operators and their codes in the bridge. (Historical Data Access Custom Interface Standard Version 1.1 section 5.3.8)

Value	Member	Description
1	OPCHDA_EQUAL	Attribute value equals filter value.
2	OPCHDA_LESS	Attribute value is less than filter value.
3	OPCHDA_LESSEQUAL	Attribute value is less than or equal to filter.
4	OPCHDA_GREATER	Attribute value is greater than filter value.
5	OPCHDA_GREATEREQUAL	Attribute value is greater than or equal to filter value.
6	OPCHDA_NOTEQUAL	Attribute value is not equal to filter value.

## Appendix E. String Format of the time

The string format of the time is considered to be a relative time local to the server. The format for the relative time is:

keyword+/-offset+/-offset...

where the keyword is described in the table below:

Keyword	Offset	Description
NOW		The current UTC time as calculated on the server.
SECOND	S	The start of the current second.
MINUTE	M	The start of the current minute.
HOURL	H	The start of the current hour.
DAY	D	The start of the current day.
WEEK	W	The start of the current week.
MONTH	MO	The start of the current month.
YEAR	Y	The start of the current year.

The offset is described in the table below:

Offset	Description
S	Offset from time in seconds.
M	Offset from time in minutes.
H	Offset from time in hours.
D	Offset from time in days.
W	Offset from time in weeks.
MO	Offset from time in months.
Y	Offset from time in years.

The offset must be preceded by a signed integer that specifies the number and direction of the offset. White space is ignored.

- The key word refers to the beginning of the specified time period:
- DAY means the timestamp at the beginning of the current day (00:00 hours, midnight)
- MONTH means the timestamp at the beginning of the current month.
- YEAR means the timestamp at the beginning of the current year.

Examples:

- "NOW-15M" would be an fifteen minutes ago.
- "NOW-1H" would be an hour ago.

"DAY -1D+7H30M" if the current date is "01/15/2004" this value represents "01/14/2004 07:30:00".

## Appendix F. OPCHDA Aggregates

The following table describes the possible values for the OPCHDA aggregates supported by the bridge. (Historical Data Access Custom Interface Standard Version 1.1 section 5.3.3)

Aggregate	Description
OPCHDA_INTERPOLATIVE	Do not retrieve an aggregate. This is used for retrieving interpolated values.
OPCHDA_TOTAL	Retrieve the totalized value (time integral) of the data over the resample interval.
OPCHDA_AVERAGE	Retrieve the average data over the resample interval.
OPCHDA_TIMEAVERAGE	Retrieve the time weighted average data over the resample interval.
OPCHDA_COUNT	Retrieve the number of raw values over the resample interval.
OPCHDA_STDEV	Retrieve the standard deviation over the resample interval.
OPCHDA_MINIMUMACTUALTIME	Retrieve the minimum value in the resample interval and the timestamp of the minimum value.
OPCHDA_MINIMUM	Retrieve the minimum value in the resample interval.
OPCHDA_MAXIMUMACTUALTIME	Retrieve the maximum value in the resample interval and the timestamp of the maximum value.
OPCHDA_MAXIMUM	Retrieve the maximum value in the resample interval.
OPCHDA_START	Retrieve the value at the beginning of the resample interval. The value is the time stamp of the beginning of the interval.
OPCHDA_END	Retrieve the value at the end of the resample interval. The value is the time stamp of the end of the interval.
OPCHDA_DELTA	Retrieve the difference between the first and last value in the resample interval.
OPCHDA_REGSLOPE	Retrieve the slope of the regression line over the resample interval.
OPCHDA_REGCONST	Retrieve the intercept of the regression line over the resample interval. This is the value of the regression line at the start of the interval.
OPCHDA_REGDEV	Retrieve the standard deviation of the regression line over the resample interval.
OPCHDA_VARIANCE	Retrieve the variance over the sample interval .
OPCHDA_RANGE	Retrieve the difference between the minimum and maximum value over the sample interval.
OPCHDA_DURATIONGOOD	Retrieve the duration (in seconds) of time in the interval during which the data is good.
OPCHDA_DURATIONBAD	Retrieve the duration (in seconds) of time in the interval during which the data is bad.
OPCHDA_PERCENTGOOD	Retrieve the percent of data (1 equals 100 percent) in the interval which has good quality.
OPCHDA_PERCENTBAD	Retrieve the percent of data (1 equals 100 percent) in the interval which has bad quality.
OPCHDA_WORSTQUALITY	Retrieve the worst quality of data in the interval.
OPCHDA_ANNOTATIONS	Retrieve the number of annotations in the interval.



## Appendix G. GSI variables status

The following table describes the possible values for the GSI-OPCHDA-ITEM status when connection takes place between G2 and the bridge process.

Value	Status Value	Description
0	GSI_OK	No error detected for the specified item.
0	OPC_GOOD_NONSPEC	The value is good. There is no special condition.
50	GSI_UNSUPPORTED_TYPE	The data type of the variable is not supported.
51	GSI_UNREGISTERED	The variable is not correctly registered with the bridge.
52	GSI_DUPLICATED_ITEM	The item is registered more than once with the same item ID.
199	OPC_E_BADRIGHTS	Insufficient rights for this operation.
200	OPC_E_INVALIDITEMID	The passed Item Id is invalid.
201	OPC_E_UNKNOWNITEMID	The item does not exist in the server address space.
300	OPC_BAD_NONSPEC	The value is bad but no specific reason is known.
301	OPC_BAD_CONFIG_ERROR	There is some server specific problem with the configuration.
302	OPC_BAD_NOT_CONNECTED	The input is required to be logically connected to something but is not.
303	OPC_BAD_DEVICE_FAILURE	A device failure has been detected
304	OPC_BAD_SENSOR_FAILURE	A sensor failure had been detected
305	OPC_BAD_LAST_KNOWN_VAL	Communications have failed. However, the last known value is available.
306	OPC_BAD_COMM_FAILURE	Communications have failed. There is no last known value is available.
307	OPC_BAD_OUT_OF_SERVICE	The block is off scan or otherwise locked This quality is also used when the active state of the item or the group containing the item is Inactive.
333	OPC_BAD_INVALID_QUALITY	Received an invalid bad quality “Not used by OPC”
400	OPC_UNC_NONSPEC	There is no specific reason why the value is uncertain.
401	OPC_UNC_LAST_USABLE_VAL	Whatever was writing this value has stopped doing so. The returned value should be regarded as ‘stale’.
404	OPC_UNC_SENSOR_NOT_ACCUR	Either the value has ‘pegged’ at one of the sensor limits (in which case the limit field should be set to 1 or 2) or the sensor is otherwise known to be out of calibration via some form of internal diagnostics
405	OPC_UNC_EGU_EXCEEDED	The returned value is outside the limits defined for this parameter.
406	OPC_UNC_SUB_NORMAL	The value is derived from multiple sources and has less than the required number of Good sources.
444	OPC_QUALITY_UNCERTAIN	There is no specific reason why the quality of the item is uncertain.
506	OPC_GOOD_LOCAL_OVERRIDE	There is some server specific problem with the configuration.
555	OPC_GOOD_INVALID_QUALITY	Received an invalid good quality “Not used by OPC”
666	OPC_INVALID_QUALITY	The quality value of the item is invalid.
1100	OPCHDA_E_DATAEXISTS	Unable to do the operation – data already present.





1101	OPCHDA_E_NODATAEXISTS	Unable to do the operation – no data exists.
1102	OPCHDA_S_NODATA	No data was found in the specified time range.
1105	OPCHDA_S_INSERTED	The requested insert occurred.
1106	OPCHDA_S_REPLACED	The requested replace occurred.
1107	OPCHDA_E_INVALIDARG	The supplied argument is invalid or unsupported.
1108	OPCHDA_W_NOFILTER	The server does not support this filter.
1109	OPCHDA_E_UNKNOWNATTRID	The server does not support this attribute.
1110	OPCHDA_E_INVALIDDATATYPE	The supplied value for the attribute is not a correct data type.
1111	OPCHDA_E_MAXEXCEEDED	The maximum number of values requested is greater than the server limit of maximum values returned.
1112	OPCHDA_S_MOREDATA	More data is available in the time range beyond the number of values requested.
1113	OPCHDA_S_EXTRADATA	There is more data available than was returned. (Used for MinimumActualTime and MaximumActualTime when there is more than one timestamp for the value.)
1114	OPCHDA_E_NOT_AVAIL	The requested aggregate is not available for the provided item.
1115	E_NOTIMPL	This server does not support this function.
1116	OPCHDA_S_CURRENTVALUE	No history available for attribute.
1120	OPCHDA_E_INVALIDATTRID	Invalid Item attribute.
1130	OPCHDA_INVALIDHANDLE	The server handle does not exist
1150	OPCHDA_E_INVALIDITEMID	Adding an OPC item failed for an unknown reason

## Appendix H. Quality Code

The following table describes the possible values for the quality when using Update RPCs.

Value	OPC DA quality	Value	OPC DA quality
0	"Bad:Non-specific:Not Limited"	32	"Bad:Waiting for Initial Data:Not Limited"
1	"Bad:Non-specific:Low Limited"	33	"Bad:Waiting for Initial Data:Low Limited"
2	"Bad:Non-specific:High Limited"	34	"Bad:Waiting for Initial Data:High Limited"
3	"Bad:Non-specific:Constant"	35	"Bad:Waiting for Initial Data:Constant"
4	"Bad:Configuration Error:Not Limited"	64	"Uncertain:Non-specific:Not Limited"
5	"Bad:Configuration Error:Low Limited"	65	"Uncertain:Non-specific:Low Limited"
6	"Bad:Configuration Error:High Limited"	66	"Uncertain:Non-specific:High Limited"
7	"Bad:Configuration Error:Constant"	67	"Uncertain:Non-specific:Constant"
8	"Bad:Not Connected:Not Limited"	68	"Uncertain:Last Usable Value:Not Limited"
9	"Bad:Not Connected:Low Limited"	69	"Uncertain:Last Usable Value:Low Limited"
10	"Bad:Not Connected:High Limited"	70	"Uncertain:Last Usable Value:High Limited"
11	"Bad:Not Connected:Constant"	71	"Uncertain:Last Usable Value:Constant"
12	"Bad:Device Failure:Not Limited"	80	"Uncertain:Sensor Not Accurate:Not Limited"
13	"Bad:Device Failure:Low Limited"	81	"Uncertain:Sensor Not Accurate:Low Limited"
14	"Bad:Device Failure:High Limited"	82	"Uncertain:Sensor Not Accurate:High Limited"
15	"Bad:Device Failure:Constant"	83	"Uncertain:Sensor Not Accurate:Constant"
16	"Bad:Sensor Failure:Not Limited"	84	"Uncertain:Engineering Units Exceeded:Not Limited"
17	"Bad:Sensor Failure:Low Limited"	85	"Uncertain:Engineering Units Exceeded:Low Limited"
18	"Bad:Sensor Failure:High Limited"	86	"Uncertain:Engineering Units Exceeded:High Limited"
19	"Bad:Sensor Failure:Constant"	87	"Uncertain:Engineering Units Exceeded:Constant"
20	"Bad:Last Known Value:Not Limited"	88	"Uncertain:Sub-Normal:Not Limited"
21	"Bad:Last Known Value:Low Limited"	89	"Uncertain:Sub-Normal:Low Limited"
22	"Bad:Last Known Value:High Limited"	90	"Uncertain:Sub-Normal:High Limited"
23	"Bad:Last Known Value:Constant"	91	"Uncertain:Sub-Normal:Constant"
24	"Bad:Comm Failure:Not Limited"	192	"Good:Non-specific:Not Limited"
25	"Bad:Comm Failure:Low Limited"	193	"Good:Non-specific:Low Limited"
26	"Bad:Comm Failure:High Limited"	194	"Good:Non-specific:High Limited"
27	"Bad:Comm Failure:Constant"	195	"Good:Non-specific:Constant"
28	"Bad:Out of Service:Not Limited"	216	"Good:Local Override:Not Limited"
29	"Bad:Out of Service:Low Limited"	217	"Good:Local Override:Low Limited"
30	"Bad:Out of Service:High Limited"	218	"Good:Local Override:High Limited"
31	"Bad:Out of Service:Constant"	219	"Good:Local Override:Constant"

For more details, please refer to the OPC Data Access specification 2.05 provided by OPC Foundation.



## Appendix I. Configuration File

G2 OPC HDA Link includes a configuration file named `ConfigFile.ini`, which includes a number of parameters related to logging. These parameters all have default settings, which you can change at start-up by editing the configuration file.

You can also change the configuration file at runtime, as described in “Configuring G2 OPC HDA Link at Runtime”.

To change this file:

Open `ConfigFile.ini` in a text editor.

Edit any of the parameters listed in the following table:

Parameter	Description	Default Value
<b>LogSetting</b>		
<code>LogFile</code>	Log file name, if not specified the default value is used.	<code>LogEvent.LOG</code>
<code>LogFileMaxSize</code>	The maximum log file size, in bytes. Once this size is reached during run-time, the log file is overwritten.	2097196 ~ 2 Mb
<code>LogLevel</code>	The log level. Possible Values are: 0 : Only fatal error messages are logged. 1 : All critical error messages are logged. 2 : All errors are logged. 3 : All warnings are logged. 4 : All information is logged. 5 : All debug information is logged. 9: The highest level.	0
<code>LogToG2</code>	TRUE : Messages appear on G2 Message Board as they are logged. FALSE: Messages are only logged to file.	FALSE
<code>ArchiveLastLog</code>	TRUE : Old file is copied to an intermediate file with incremental extension, before being overwritten. FALSE : Any pre-existing log file is erased and overwritten at start-up.	FALSE
<code>LogToScreen</code>	TRUE : Messages appear on console screen as they are logged. FALSE : Messages are only logged to file.	FALSE
<b>Quality</b>		
<code>QualityFilter</code>	The filter that will be applied to the GSI variable’s status value. See “Filtering Data Sent to G2 using the GSI Variable Status” on page 34.	111
<b>ServerStatus</b>		
<code>CheckStatus</code>	Enables/Disables OPC server status check	TRUE
<code>KeepServerConnected</code>	when the OPC servers status goes to <code>OPCHDA_DOWN</code> , to keep the bridge connected to G2,	TRUE



	set this value to TRUE. If FALSE the connection will be closed.	
CheckFrequency	The frequency at which the bridge checks the OPC server status (in seconds).	20
UseG2TimeStamp	FALSE: The bridge uses the timestamp provided by the OPC Server. TRUE: The bridge ignores the OPC Server timestamp and uses G2 timestamp.	FALSE
NotifyG2	Enables/Disables sending OPC server status updates to the G2 By default, G2 is not notified by the current values of status and time attributes of the OPC server.	FALSE
<b>ReadMode</b>		
ReadMode	Specifies the read mode to use in order to retrieve last data values. Possible values are: - 1: Synchronous read at time - 2: Synchronous read raw	1

**Note:** Save the file for the log settings to take effect.

**Sample Configuration File:**

```
[LogSetting]
LogFileName=LogEvent.LOG
LogFileMaxSize=2097196
LogLevel=0
LogToG2=FALSE
LogToScreen=TRUE
ArchiveLastLog=FALSE
[ServerStatus]
CheckStatus=TRUE
StayConnected=TRUE
CheckFrequency=20
NotifyG2=FALSE
[ReadMode]
ReadMode=1
```

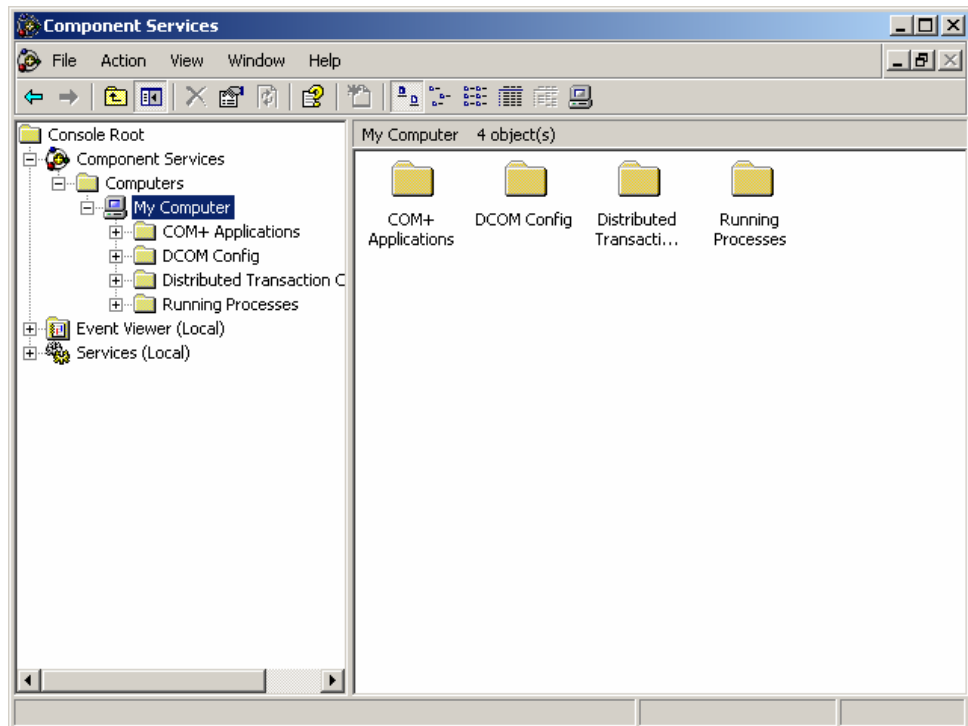
## Appendix J. Configuring the Client for DCOM

### Configuring the Client for DCOM for Windows XP

#### Setting up the Client

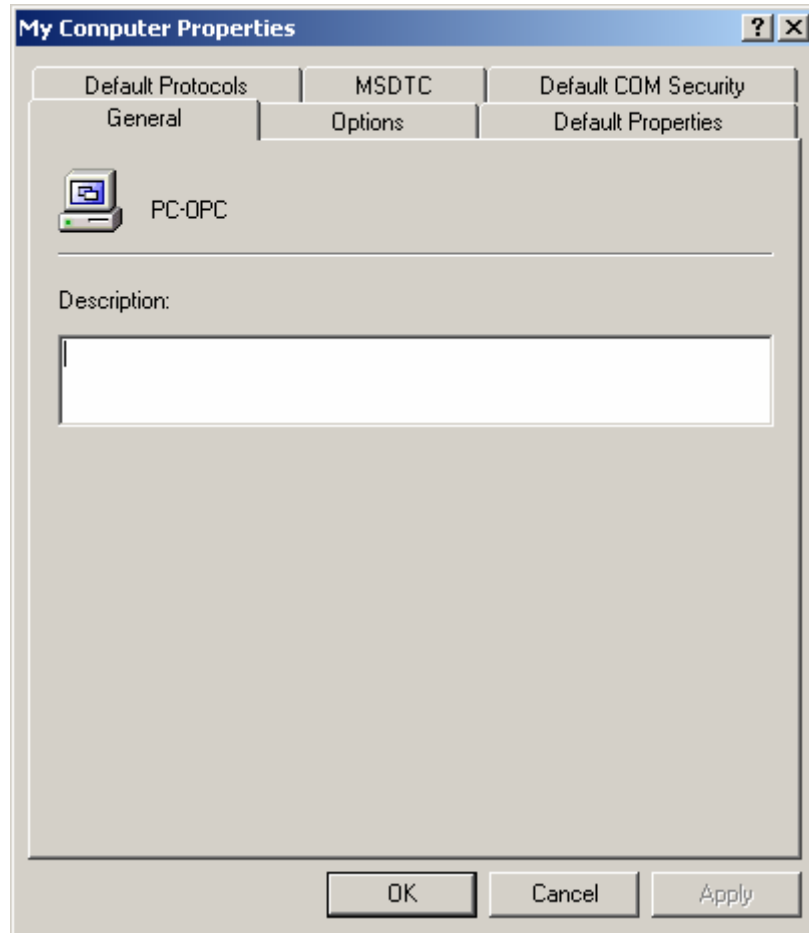
To set up client:

- 1 Log as Administrator.
- 2 Choose **Component Services** from **Control Panel > Administrative Tools**.



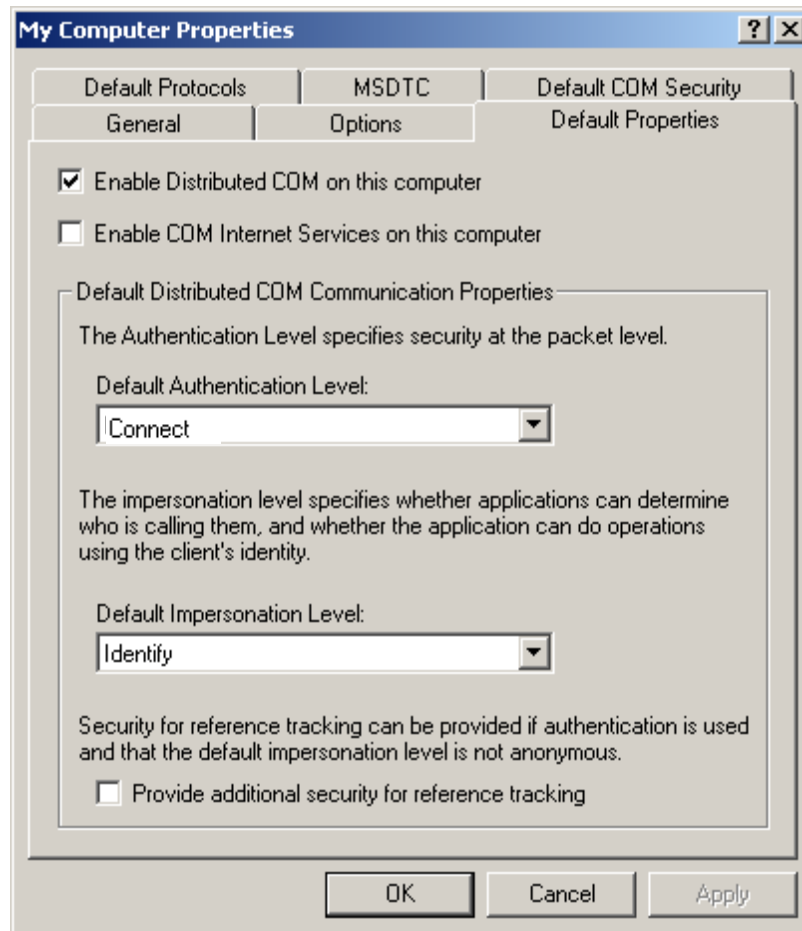
- 3 From Action menu, select Computer Properties. This section is similar to configuring com with Windows NT.

The Computer Properties configuration utility looks like this:

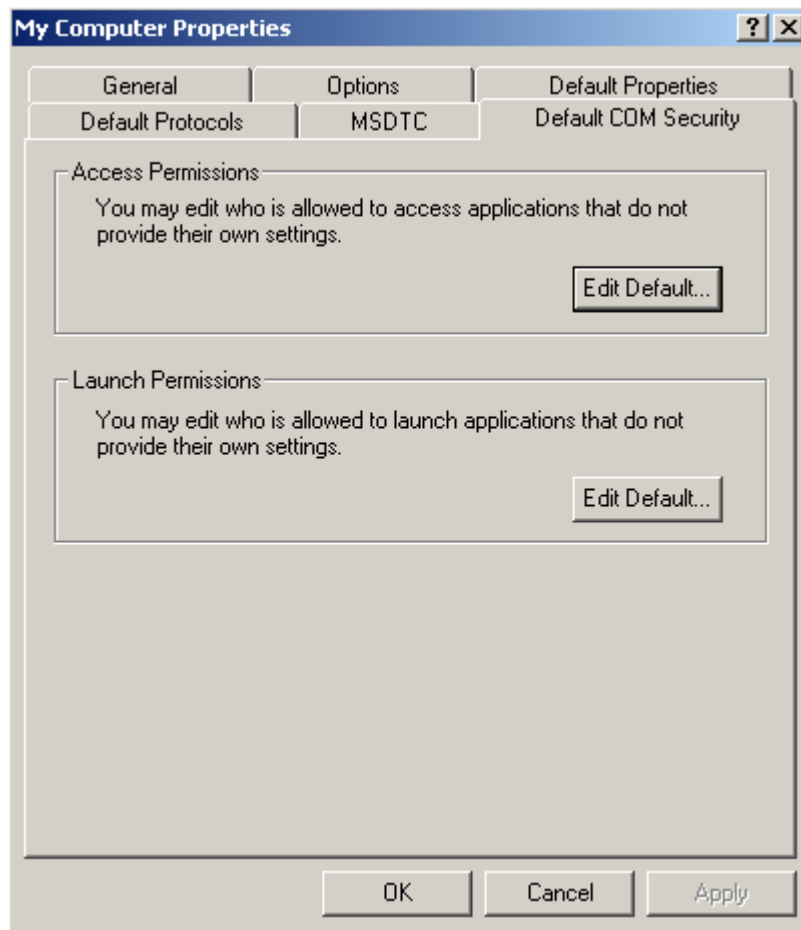


- 4 Click the Default Properties tab and configure the dialog, as follows:
  - d Ensure that the Enable Distributed COM on this computer is enabled.
  - e Configure the Default Authentication Level to be Connect.
  - f Configure the Default Impersonation Level to be Identity.

The Default Properties tab should look like this:



- 4 Click the Default Security tab:

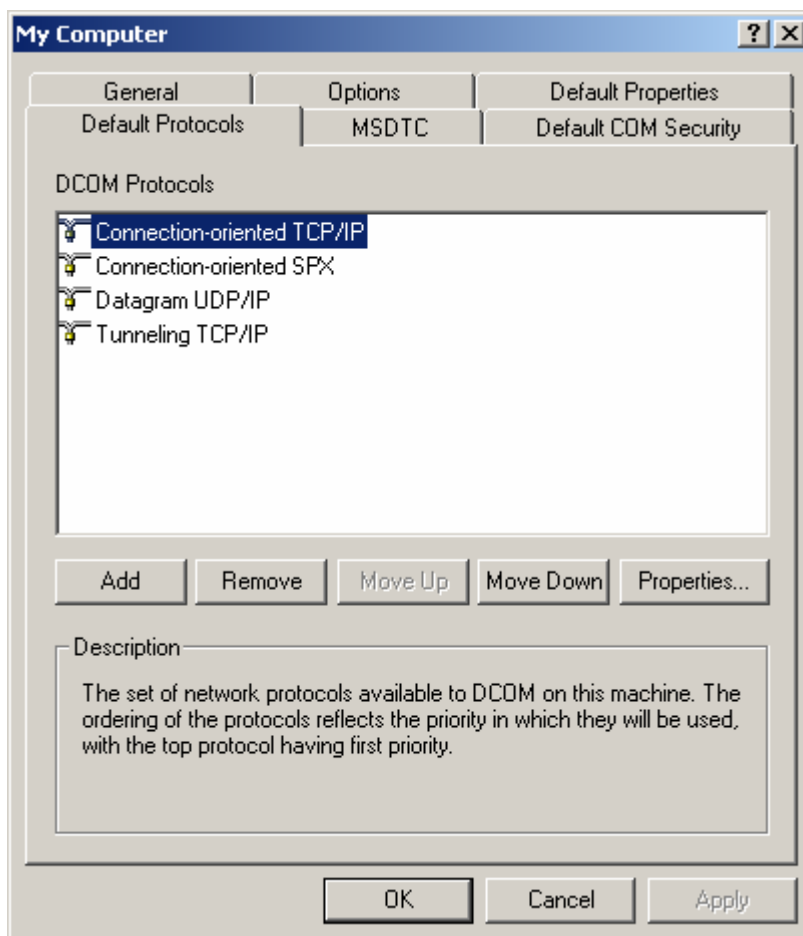


This is where you configure who has access to G2 OPCHDALink from remote OPC servers. You only need to be concerned with the Default Access Permissions button on this tab.

- 5 Under Default Access Permissions, click the Edit Default button and configure the users of remote OPC Servers whom you want to be able to make callbacks to this machine when G2 OPCHDALink performs subscription-based read operations.



- 6 Click the Default Protocols tab:



This is where you set the network protocols on the client computer to use DCOM.

- 7 Configure the DCOM Protocol to use Connection-oriented TCP/IP.

### Registering OPC Server(s)

You must now register the OPC Server(s) that G2 OPCHDALink will connect to and specify their locations on the named remote servers. You can use one of two techniques, depending on the client environment.

#### To register the OPC Server(s), using a customized registry file:

- ➔ Prepare and apply a customized `.reg` file on the client computer, as described in the Microsoft registry documentation.

#### To register the OPC Server(s) automatically:

- 1 Install the OPC Server on the client computer, to automatically register the server in the registry.
- 2 Remove the entries for `InProc` and `OutOfProc` servers, then add an entry for `RemoteServerName`

The DCOM configuration utility uses this technique, but you must still configure the client computer manually.

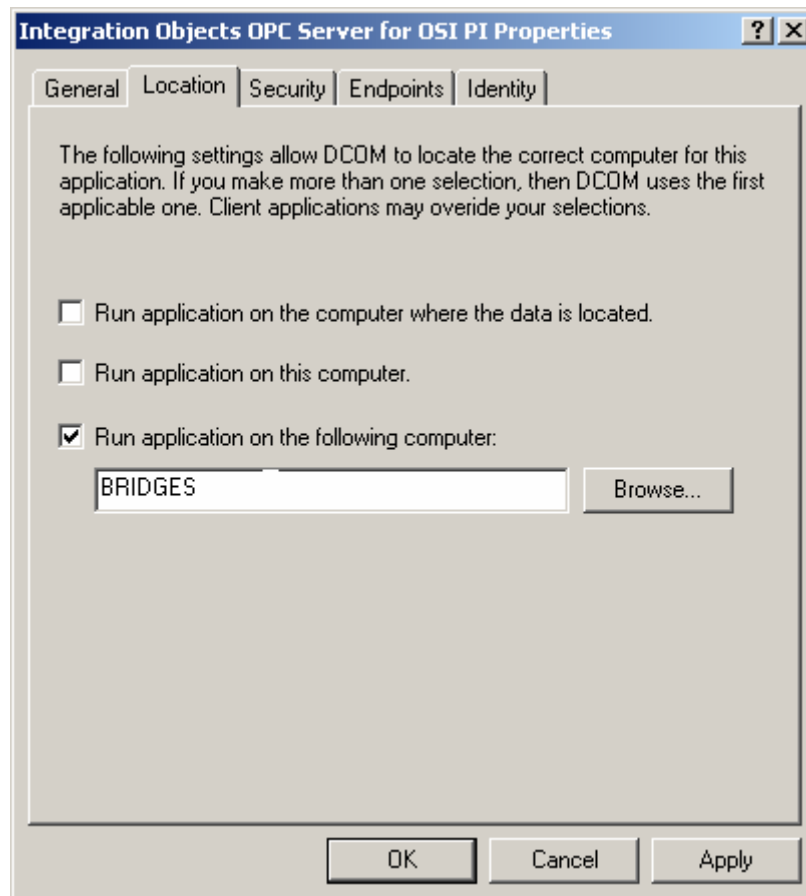
**Note**

In either case, the desired registry information for the OPC Server must not include the LocalServer32 or InProcServer32 keys, and must include the AppID key and the associated RemoteServerName.

If the server application name does not show up in the DCOM config control panel, make sure that there is an AppID key associated with the object server's CLSID in the Registry, as follows:

```
[HKEY_ROOT_CLASSES\CLSID\{clsid}]  
"AppID"="{clsid}"
```

For example, when installing the OPC Server on the client computer, to access remotely "Integration Objects OPC for PI," which is an OPC server for PI, enable the Run application on the following computer option and enter the NetBIOS name of the computer on which to run the application, as shown below:



## Configuring the Server for DCOM (Windows XP)

### Setting up the Server

#### To set up the server:

- 1 Launch the Component Services Utility on the computer your target OPC Server is running.
- 2 Configure the Default Properties tab as you did on the client side.
- 3 Click the Default Security tab.

This is where you tell the operating system who you will allow to access OPC Servers on this machine (Default Access Permissions), who you will allow to launch OPC Servers on this machine (Default Launch Permissions), and who you will allow to configure OPC Servers on this machine (Default Configuration Permissions).

- 4 Click the Default Access Permissions tab.

On this tab, when you click Add you will be presented with a dialog that lets you browse the local machine and domain (if applicable and logged into a domain) for users and groups to which to grant permissions.

- 5 Click the Default Security tab and click Edit Defaults under Default Launch Permissions.

On this tab, you define who can actually start your OPC Server on this computer. You add users/groups the same way you did when configuring Access Permissions.

- 6 On the Default Security tab, click Edit Defaults under Default Configuration Permissions.

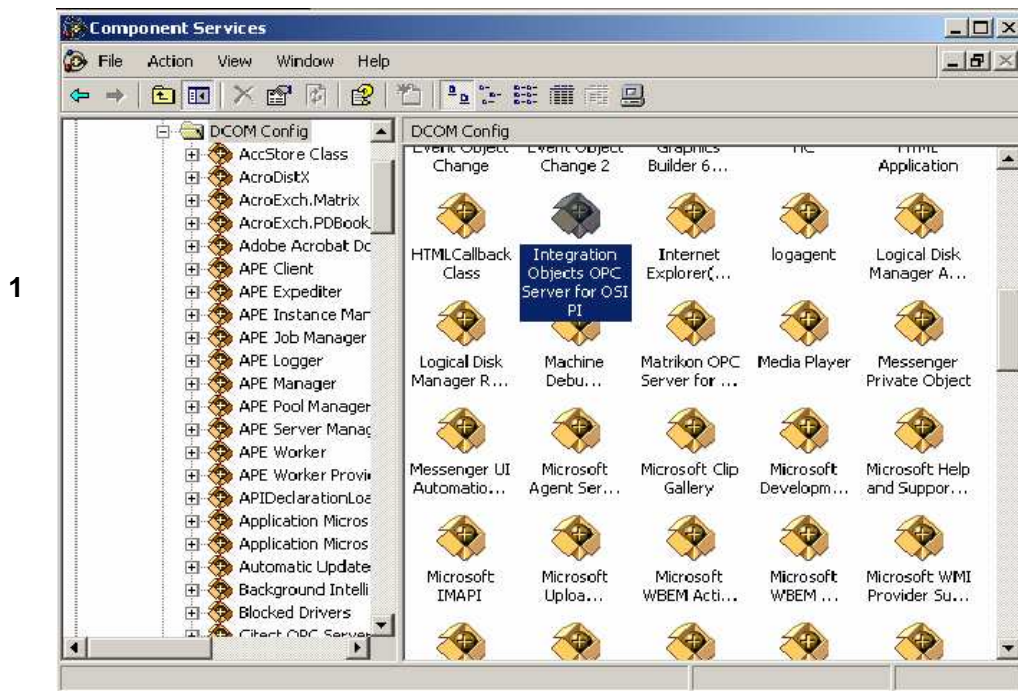
If you are setting up DCOM for the first time, we recommend that you do not change these settings.

- 7 Configure the Default Protocols tab as you did on the client side.

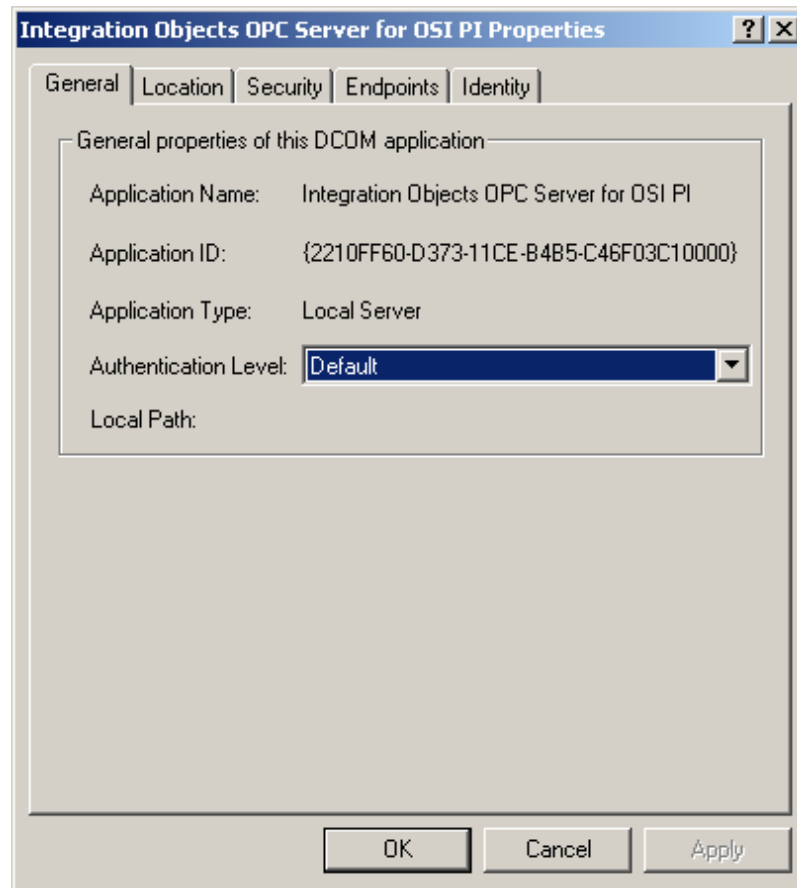
## Configuring DCOM Settings for Your OPC Server

To configure DCOM settings for your OPC Server:

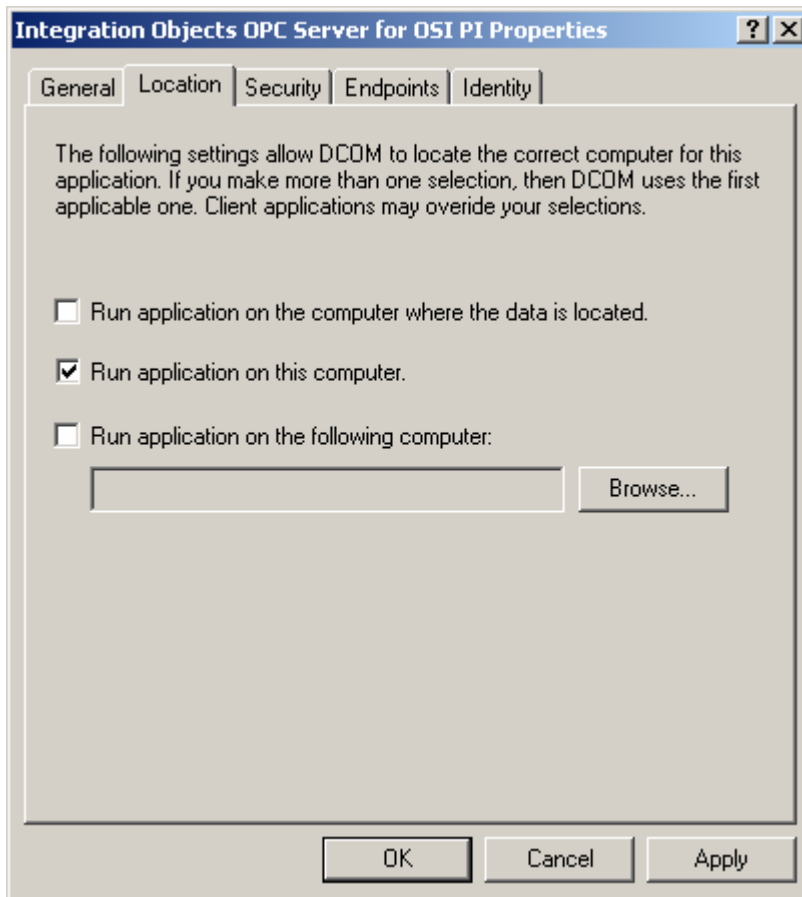
Click the Application tab in DCOM Configuration dialog and browse until find the OPC Server of your choice.



- 2 Select the server and either double-click it or choose Properties to configure server-specific settings, as follows:
  - a On the General tab, we recommend that you leave the Authentication Level to be Default:

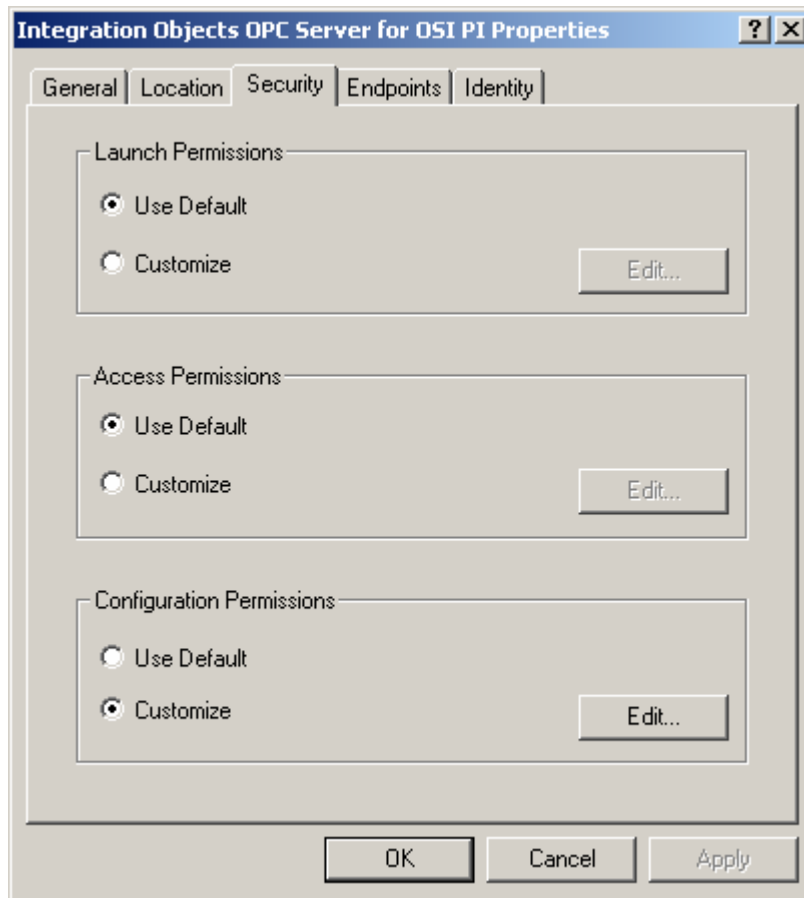


- b On the Location Tab, ensure that Run application on this computer is the only check box that is checked:



- c On the Security Tab, we recommend that you:
- Enable Use default access permissions, which means users/groups shown under Default Security tab in the DCOM configuration utility will have access to connect to this OPC Server.
  - Enable Use default launch permissions.
  - The same rules apply about using custom launch permissions here as they do for custom access permissions. If you choose to use the custom permissions to override the defaults, specify which users/groups to which you want to grant permission

The dialog looks like this:



- d** On Identity Tab, you specify under what user account you want the OPC Server to run.

This is probably one of the most important settings for the OPC Server, depending on how you will be using your system.

You do not need to configure anything on the Endpoints tab.

## Appendix K. G2-OPC-SET-CONNECTION-STATUS Procedure

To enable the G2 receiving updates of the attributes `opc-server-status` and `opc-server-time` of the `GSI-OPCHDA-INTERFACE` class from the bridge, the end-user needs to implement a local procedure, named 'G2-OPC-SET-CONNECTION-STATUS' in his kb.

**G2-OPC-SET-CONNECTION-STATUS**(ServerState: symbol, ServerTime: value, InterfaceName: symbol)

Argument	Description
ServerState	The value of the <code>opc-server-state</code> attribute
ServerTime	The value of the <code>opc-server-time</code> attribute
InterfaceName	The name of the <code>GSI-OPCHDA-INTERFACE</code> object to which the received updates belong.

Example:

**G2-OPC-SET-CONNECTION-STATUS**(ServerState: symbol, ServerTime: value, InterfaceName: symbol)

```
HDA_Interface: class gsi-opchda-interface;  
begin
```

```
  for HDA_Interface =each gsi-opchda-interface do  
    if HDA_Interface has a name then  
      begin  
        if the Names of HDA_Interface = InterfaceName then  
          begin  
            conclude that the opc-server-status of HDA_Interface = ServerState;  
            conclude that the opc-server-time of HDA_Interface = ServerTime;  
          end  
        end  
      end  
    end  
  end
```

```
end
```



## Appendix L. Common Error Codes

### Common Error Codes

The following error codes are common for all RPCs listed above.

Error Code	Description
-1	No OPC Server for this context.
-4	No item matches this handle.
-5	Failed to get Interface.
-6	Bad number of parameters.
-7	Invalid parameters types.
-8	Invalid Operation.
-9	Invalid operation: the given flag is invalid.
-11	The function was unsuccessful.